Predictors of Senior Center Use among Older Adults in New York City Public Housing

Amanda E. Schneider, Nancy Ralph, Carolyn Olson,
Anne-Marie Flatley, and Lorna Thorpe

ABSTRACT *Despite agreement among stakeholders that senior centers can promote physical and mental health, research on senior center use in urban populations is limited. Our objective was to describe demographic and health factors associated with senior center use among urban, low-income older adults in order to inform programming and outreach efforts. We used data from a 2009 telephone survey of 1036 adults randomly selected from rosters of New York City public housing residents aged 65 and older. We analyzed senior center use by race/ethnicity, age, gender, health, housing type, and income, and used a forward selection approach to build best-fit models predicting senior center use. Older adults of all ages and of both genders reported substantial use of senior centers, with nearly one third (31.3%) reporting use. Older adults living alone, at risk of depression, or living in specialized senior housing had the greatest use of centers. Senior center use varied by race/ethnicity, and English-speaking Hispanics had a higher prevalence of use than Spanish-speaking Hispanics (adjusted prevalence ratio [PR]=1.69, 95% CI: 1.11-2.59). Spanish-speaking communities and older adults living in non-senior congregate housing are appropriate targets for increased senior center outreach efforts.*

KEYWORDS *Aging, Community-Based Services, Mental Health, Older Adults, Public Housing, Racial and Ethnic Diversity, Senior Centers, Service Utilization*

Senior centers are places where older adults can go for “support, engagement, and basic needs”.¹ Centers are a potential mechanism for linking seniors to resources and services, and for providing attendees with meals and opportunities for socialization, exercise, and education.² There is broad support for senior centers among health professionals, community leaders, and older adults themselves.^{1,3–5} From an assessment of New York City senior centers, stakeholders from different arenas identified the following list as “critical and core” functions of senior centers: 1) providing opportunities for social engagement; 2) providing a link to public services and benefits; 3) providing a link to community resources; 4) providing nutritional support; and 5) promoting physical health, mental health, and healthy behaviors.¹ Serving poor and minority older adults is a priority for senior centers.¹

Schneider and Olson are with the New York City Department of Health and Mental Hygiene, 42-09 28th Street, Long Island City, NY 11101, USA; Ralph and Thorpe are with the Epidemiology and Biostatistics Program, CUNY School of Public Health at Hunter College, New York, NY, USA; Flatley is with the Department of Research and Management Analysis, New York City Housing Authority, New York, NY, USA; Ralph is with the Brain Trauma Foundation, New York, NY, USA.

Correspondence: Amanda E. Schneider, New York City Department of Health and Mental Hygiene, 42-09 28th Street, Long Island City, NY 11101, USA. (E-mail: aschneider@health.nyc.gov)

Ultimately, the impact of senior centers depends both on the benefits for attendees and on the number of seniors who attend.⁶

Several prior studies have characterized senior center users using data from local and nationwide surveys. Most studies have identified lower income⁷⁻⁹ and older age range (75-84)^{7,10,11} as factors associated with senior center use. Women have been found to be more likely to attend senior centers than men^{7,11,12} and to have a more positive perception of senior center benefits.¹³ Some studies have found that Blacks and other minorities are more likely to use senior centers than Whites, but results have not been consistent, potentially reflecting different study settings and designs.^{7-9,11} Data are also inconsistent regarding whether having more^{5,7} or fewer¹⁴ social contacts predicts senior center use. Some studies identified that older adults with no or few functional limitations were more likely to attend centers than those with more limitations.^{7,8,10,15} Other identified predictors of senior center use have included knowledge about and positive attitude towards senior centers,¹⁴ friendships with senior center users,¹⁶ physical proximity, and transportation access.^{16,17}

In New York City (NYC), there are approximately 300 city-administered senior centers operated by different organizations that vary in size, range of services and programs offered, staffing, and populations served.^{18,19} In 2009, many (90+) senior centers were located on public housing premises, and some (40) were funded and staffed by the NYC Housing Authority (NYCHA). NYCHA older adult residents are a racially diverse low- and moderate-income population who comprise more than 10 % of all of NYC's low-income older adults. The proportion of NYCHA residents who are over age 65 is expected to grow over the next few decades due to a low rate of residential turnover.¹⁸ NYCHA older adults have poor health compared with NYC older adults overall, including higher rates of chronic conditions and self-reported poor or fair health,²⁰ making senior center services particularly important for this population. The main goals of this research were to characterize senior center use in this population and to determine primary predictors of senior center use, overall and across different racial/ethnic and language groups. Improving our understanding of the predictors of senior center use among older public housing residents can help focus programming and outreach in order for senior centers to better serve poor and minority urban older adults.

DATA AND METHODS

Survey Design and Study Population

The 2009 NYCHA Senior Survey was a telephone survey of NYCHA residents ages 65 and older that contained questions relating to several aspects of older adult health.¹⁸ Residents were randomly selected from the NYCHA administrative tenant data system (TDS) which includes all authorized residents and contained valid records and telephone numbers for 58,484 residents aged 65 and older as of June 2009. The survey was conducted over a two week period in June 2009 by trained interviewers at the Baruch Survey Research Unit at the City University of New York. The response rate was 34.7 % and the cooperation rate was 93.4 %, yielding 1036 completed surveys.¹⁸ The survey was administered in English, Spanish, Russian, and Chinese. Survey respondents were significantly less likely than non-respondents to be male, Hispanic, and Manhattan residents. Data were weighted to be representative of the NYCHA older adult population on gender, household income,

borough, age, and race/ethnicity. After weighting, survey respondents did not differ from non-respondents on the following characteristics captured in the TDS system: household size; type of housing development; rates of mobility; and vision, mental, or hearing disabilities. Survey respondents were slightly less likely to use a wheelchair than non-respondents (3 % vs. 5 %; Pearson $\chi^2=4.38$; $p=0.036$). These findings indicate that the weighted survey data are representative of the NYCHA senior population overall.¹⁸ This study analyzed surveys with data on senior center use ($n=1000$).

Study Variables

The main outcomes of interest were any use of senior centers and frequent attendance at senior centers. Residents were asked: “In the past three months, how often did you use a senior center?” Response categories included “Every day”, “A few days a week”, “Once a week”, “Once a month or less”, and “Never”. Residents who indicated any senior center use in the past three months were considered senior center users. Among residents who reported using a senior center in the past three months, residents who indicated that they used centers “a few days a week” or “every day” were considered frequent attenders.

Demographic variables included in this analysis, including gender, age, race (recoded as Hispanic, Non-Hispanic Black, Non-Hispanic White, and Non-Hispanic Asian), development type, development name, household size, and household income, were obtained from TDS. Type of housing development was categorized as senior-only, mixed or Naturally Occurring Retirement Community (NORC), and family (non-NORC). NYCHA older adults can choose to live in senior-only housing, where they have case management services and a system of floor captains to prevent isolation. Senior-only developments consist entirely of senior-only housing, while mixed developments have both senior-only and family buildings. NORC programs in NYC are public-private partnerships that provide funding for a range of health and outreach services in communities with high proportions of older residents.²¹ Mixed developments and NORCs were considered one category for analysis because they both have an elevated proportion of residents ages 62 and older (25-50 %) compared to family developments (<25 %). NYCHA tenure, or length of time residing in NYCHA housing, was categorized as greater than 15 years versus 15 years or less. Place of birth was coded as Puerto Rico, Other US, Other Latin America, and Other International.

Additional data relating to health and demographics, including self-reported health status, Activity of Daily Living (ADL) limitations, current risk for depression, available assistance, and food insecurity were obtained from the NYCHA senior survey. ADL limitations assessed in the survey included difficulty bathing or showering, dressing, eating, getting in and out of bed or chairs, using or getting to the toilet, and getting around inside the home. Risk for depression was assessed using the Patient Health Questionnaire (PHQ-2) scale, a validated scale for depression screening, consisting of the two questions “During the past 2 weeks, how often have you been bothered by little interest or pleasure in doing things?” and “During the past 2 weeks, how often have you been bothered by feeling down, depressed or hopeless?”²² These two items were moderately correlated within this population (Chronbach’s $\alpha = 0.61$). Availability of assistance, one aspect of social support, was determined by asking: “Is there a friend, relative or neighbor who could assist you for a few days if necessary?” Food insecurity was determined by asking three questions about different aspects of potential food insecurity: “In the

past 30 days, have you been concerned about having enough food to eat?”, “In the past 30 days, did you ever eat less than you felt you should because there wasn’t enough money to buy food?”, and “In the past 30 days, were you ever hungry but didn’t eat because you weren’t able to get out to buy food?” Respondents who answered yes to any of these three questions were considered food insecure.

In NYC, older adult communities often coalesce among people who are relatively similar to each other both racially and linguistically.²³ For this reason, rather than examining race and language as separate variables, a “race/language” variable was created by combining data on race/ethnicity from TDS and survey data on language of survey administration and language spoken at home. The race/language variable divided the Hispanic group into two categories: those interviewed in English and those interviewed in Spanish. The non-Hispanic White group was also divided into two categories: those interviewed in English and those interviewed in Russian. The numbers of non-Hispanic Blacks who were not interviewed in English and did not report speaking English at home ($n=2$ interviewed in Spanish) and Asians who were not interviewed in Chinese and did not report speaking Chinese at home ($n=5$ interviewed in English) were small, and thus these individuals were excluded from all race/language analysis.

Statistical Procedures

SAS Version 9.2 was used for statistical analysis.²⁴ Multivariable modeling used relative risk regression with generalized estimating equations and robust standard error estimates to account for clustering of respondents within housing developments (Lumley et al. 2006; Orelie 2001).

Forward selection approaches were used to identify significant predictors of (1) any senior center use in the past 3 months and (2) frequent senior center attendance among senior center users. Variables significantly associated with senior center use at $\alpha=0.1$ by the Rao-Scott χ^2 Test were added to the model, and gender was tested as a potential predictor because of consistent findings in the literature that senior center use is more common among women. Variables were added sequentially based on magnitude of association and retained if significant at $\alpha=0.05$. Due to minimal missing data (95 %-100 % nonmissing for all variables other than senior center use) we chose pairwise deletion of missing values for all bivariable analysis. The final sample size for any senior center use was $n=970$ and for frequent senior center use was $n=313$.

After this variable selection process was completed, hypothesized interactions were tested for the model of any senior center use in the past three months. We tested potential interactions between age and ADL limitations and between age and health status. Interactions were retained in the final models if one or more of the interaction terms was significant at $\alpha=0.05$ after multiple adjustments. After this process, we selected a model from the two different models (which both had significant interaction terms) based on the QIC goodness-of-fit statistic.

Because of our interest in the relationships between race/language and senior center use and frequency of attendance, we augmented the base models to include any variables found to confound that association. We retained potential confounders (with significant associations at $\alpha=0.1$ by Rao-Scott χ^2 Test with both senior center outcomes and race/language) in the final model if inclusion changed the beta coefficient for at least one of the race/language categories more than 10 % for ever-use of centers or 15 % for frequent use of centers. Income level was tested as a potential confounder in the frequent senior center attendance model because it is

consistently associated with prevalence and frequency of senior center use in the literature.^{7-9,25}

We used 10-fold cross validation to validate our final models. The dataset was randomly partitioned into 10 sections. Each section was used once as a test set against the other 9 sections as a training set. For the cases in each test set, we generated the predicted probability of senior center use by fitting our model to the other 90 % of the data (training set). We then calculated the AUC (c-statistic) for the predicted probabilities that were generated by this cross validation.^{26,27}

RESULTS

Study Population

Older adult residents living in NYCHA in 2009 were predominantly female (71 %) (Table 1). Almost half (49 %) had a household income below the federal poverty level, and about half (54 %) lived alone. Three-quarters of NYCHA older adults lived in family housing (74 %), 14 % lived in senior-only developments, and an additional 12 % lived in mixed developments or NORCs. Most (74 %) had resided in NYCHA for longer than 15 years (median NYCHA tenure, 32 years). The largest race/language groups were English-speaking non-Hispanic Black residents (42 %), Hispanic residents interviewed in English (22 %), and Hispanic residents interviewed in Spanish (21 %).

Any Senior Center Use

Overall, 31 % of NYCHA older adults reported any senior center use in the past three months. In bivariable analysis, a number of factors were associated with senior center use, including living in senior-only developments or in mixed developments/NORCs compared to family developments, having a lower household income, living alone, and having a longer tenure living in NYCHA (Table 2). Race/language was strongly associated with use of senior centers, with the highest prevalence of use among Chinese-speaking Asians (54 %), and the lowest among Hispanics interviewed in Spanish (19 %). Men and women had similar prevalences of senior center use.

Frequent Senior Center Attendance

Among those reporting senior center use, 63 % reported visiting the centers frequently (more than once a week). Frequent attendance was more common among men than among women, and its prevalence also varied significantly by race/language. The race/language group with the lowest prevalence of frequent senior center attendance among users was Chinese-speaking Asians (38 %), compared to 58 % for English-speaking non-Hispanic Blacks and 67-75 % for other race/language groups (Table 3).

Regression Results: Any Senior Center Use

Significant predictors of any senior center use in the past three months included race/language, household size, development type, age group, ADL limitations, an interaction between ADL limitations and age group, and current risk of depression (Table 4). Race/language was the strongest predictor of senior center use. Chinese-speaking Asians (prevalence ratio [PR]=2.44, 95 % confidence interval [CI]: 1.47-4.05), English-speaking non-Hispanic Blacks (PR=1.72, 95 % CI: 1.20-2.49), and

TABLE 1 Characteristics of residents ages 65 and older living in New York City Housing Authority developments, June 2009 (n=1000)^a

	Frequency	Percent ^b	95 % Confidence Limits		
Gender					
Male	244	29.1	25.8	-	32.3
Female	756	70.9	67.7	-	74.2
Age					
75 and older	439	44.0	40.7	-	47.4
65-74	561	56.0	52.6	-	59.3
Race/Language					
Hispanic, Spanish	140	21.2	18.1	-	24.3
Hispanic, English	148	22.4	19.3	-	25.6
Black, English	568	41.8	38.6	-	45.0
White, English	58	5.9	4.3	-	7.4
White, Russian	38	3.5	2.4	-	4.7
Asian, Chinese	37	5.1	3.4	-	6.7
Housing Type					
Family	749	73.9	70.9	-	76.9
Mixed or NORC	114	12.3	10.0	-	14.6
Senior Only	137	13.8	11.5	-	16.2
Household Size					
Lives with Others	459	46.4	43.0	-	49.8
Lives Alone	541	53.6	50.2	-	57.0
Household Income					
<100 % FPL	464	49.0	45.6	-	52.4
100 % to < 200 % FPL	321	30.4	27.3	-	33.5
200 %+ FPL	214	20.6	17.9	-	23.3
Health Status					
Excellent/Very Good/Good	396	38.8	35.5	-	42.1
Fair/Poor	597	61.2	57.9	-	64.5
Number of ADL (Activity of Daily Living) Limitations Identified					
At least 1 ADL identified	275	28.5	25.4	-	31.6
No ADLs identified	715	71.5	68.4	-	74.6
Place of Birth					
Puerto Rico	191	30.0	26.6	-	33.5
Other US	568	46.2	42.9	-	49.6
Other Latin America	69	10.0	7.7	-	12.3
Other International	132	13.8	11.4	-	16.1
Length of Time in NYCHA Housing					
Fifteen years or less	253	26.3	23.3	-	29.3
More than 15 years	736	73.7	70.7	-	76.7

^a Data were missing from one or more respondents for the following variables: race/language (n=11), household income (n=1), health status (n=7), ADL limitations (n=10), current risk for depression (n=10), assistance available (n=11), length of time in NYCHA housing (n=11).

^b weighted survey data

Hispanics interviewed in English (PR=1.69, 95 % CI: 1.11-2.59) were all significantly more likely to use senior centers than Hispanics interviewed in Spanish. Living in senior-only or mixed/NORC housing type and living alone remained significant positive predictors of senior center use after multiple adjustments, as did

TABLE 2 Senior Center Use among NYCHA older residents, by socio-demographic and health characteristics (n=1000) ^a

	Percent ^b	95 % Confidence Limits	P-value (gEE)	Prevalence Ratio	95 % Confidence Limits
Overall					
Gender					
Male	31.3	28.2 - 34.5			
Female	34.5	28.2 - 40.9	0.231	1.15 ref	0.92 - 1.44
Age	30.0	26.5 - 33.6	—	—	—
75 and older	35.0	30.1 - 39.9	0.020	1.22 ref	1.03 - 1.45
65-74	28.5	24.5 - 32.5	—	—	—
Race/Language					
Black, English	34.2	30.1 - 38.3	0.001	1.79	1.25 - 2.55
White, English	31.9	19.3 - 44.6	0.071	1.67	0.96 - 2.90
White, Russian	27.1	11.8 - 42.3	0.311	1.41	0.72 - 2.77
Asian, Chinese	54.2	37.5 - 70.8	<.0001	2.83	1.79 - 4.47
Hispanic, English	32.1	24.4 - 39.8	0.019	1.67	1.09 - 2.58
Hispanic, Spanish	19.2	12.3 - 26.0	—	ref	—
Development Type					
Senior-only	47.2	38.1 - 56.3	<.0001	1.76	1.41 - 2.20
Mixed or NORC	40.7	30.9 - 50.5	0.001	1.52	1.18 - 1.96
Family, non-NORC	26.8	23.4 - 30.3	—	ref	—
Self-Reported Health					
Excellent/Very Good/Good	33.5	28.4 - 38.7	0.268	1.13	0.91 - 1.40
Fair/Poor	29.7	25.8 - 33.6	—	ref	—
ADL limitations					
At least One ADL limitation	32.8	26.7 - 38.9	0.520	1.07	0.87 - 1.31
No ADL limitations identified	30.7	27.0 - 34.4	—	ref	—
Current Risk for Depression					
Yes	37.5	29.1 - 45.9	0.106	1.24 ref	0.95 - 1.61
No	30.2	26.8 - 33.6	—	—	—

TABLE 2 Continued

	Percent ^b	95 % Confidence Limits		P-value (GEE)	Prevalence Ratio	95 % Confidence Limits	
Live Alone							
Yes	36.3	31.9	-	40.7	0.002	1.42	1.14
No	25.6	21.3	-	29.9	—	ref	—
Assistance Available							
No	35.8	29.7	-	42.0	0.059	1.22	0.99
Yes	29.3	25.7	-	33.0	—	ref	—
Food Insecurity							
Yes	34.1	26.7	-	41.4	0.424	1.11	0.86
No	30.7	27.2	-	34.1	—	ref	—
Household Income Level							
< 100 % FPL	34.7	30.0	-	39.3	0.011	1.53	1.10
100 % to < 200 % FPL	31.9	26.4	-	37.5	0.048	1.41	1.00
200 % + FPL	22.7	16.6	-	28.8	—	ref	—
Income Below Poverty Line							
Yes	34.7	30.0	-	39.3	0.049	1.23	1.00
No	28.2	24.1	-	32.4	—	ref	—
Length of Time in NYCHA Housing							
Fifteen Years or Less	37.9	31.3	-	44.4	0.021	1.29	1.04
More than 15 Years	29.4	25.8	-	33.0	—	ref	—

^a Data were missing from one or more respondents for the following variables: race/language (n=11), household income (n=1), health status (n=7), ADL limitations (n=10), current risk for depression (n=10), assistance available (n=11), length of time in NYCHA housing (n=11).

^b weighted survey data

TABLE 3 Prevalence of Frequent Senior Center Attendance (more than once a week) among users (n = 319) ^a

	Percent ^b	95 % Confidence Limits	P-value	Prevalence Ratio	95 % Confidence Limits
Overall	63.0	57.3 - 68.8	—	—	—
Gender					
Male	53.7	42.5 -	0.037	0.80	- 0.99
Female	67.4	60.9 -	—	ref	—
Age					
75 and older	65.4	57.3 -	0.413	0.93	- 1.11
65-74	60.8	52.6 -	—	ref	—
Race/Language					
Black, English	57.7	50.3 -	0.045	0.76	- 0.99
White, English	67.0	44.3 -	0.572	0.89	- 1.34
White, Russian	68.5	37.8 -	0.664	0.91	- 1.40
Asian, Chinese	38.3	17.1 -	0.028	0.51	- 0.93
Hispanic, English	73.4	60.5 -	0.853	0.97	- 1.30
Hispanic, Spanish	75.4	57.9 -	—	ref	—
Development Type					
Senior-only	68.6	56.9 -	0.623	1.05	- 1.28
Mixed or NORC	46.8	30.9 -	0.092	0.72	- 1.06
Family, non-NORC	65.3	58.2 -	—	ref	—
Self-Reported Health					
Fair/Poor	59.2	51.4 -	0.149	0.86	- 1.06
Excellent/Very Good/Good	68.9	60.3 -	—	ref	—
ADL limitations					
At least One ADL limitation	60.3	49.3 -	0.526	0.94	- 1.14
No ADLs identified	64.1	57.3 -	—	ref	—
Current Risk for Depression					
Yes	66.2	53.3 -	0.603	1.06	- 1.32
No	62.5	56.0 -	—	ref	—

TABLE 3 Continued

	Percent ^b	95 % Confidence Limits			P-value	Prevalence Ratio	95 % Confidence Limits	
Live Alone								
Yes	67.3		60.2	-	74.4	0.073	1.20	-
No	56.0		46.5	-	65.6	—	ref	—
Assistance Available								
Yes	64.5		57.5	-	71.5	0.497	1.07	-
No	60.4		50.0	-	70.8	—	ref	—
Food Insecurity								
Yes	69.3		57.7	-	81.0	0.181	1.13	-
No	61.3		54.8	-	67.9	—	ref	—
Household Income Level								
<100 % FPL	64.5		56.7	-	72.3	0.450	1.12	-
100 % to < 200 % FPL	63.2		53.0	-	73.4	0.577	1.10	-
200 % + FPL	57.4		42.2	-	72.7	—	ref	—
Length of Time in NYCHA Housing								
Fifteen Years or Less	60.2		49.5	-	70.9	0.486	0.94	-
More than 15 Years	64.2		57.4	-	71.0	—	ref	—

^a Data were missing from one or more respondents for the following variables: race/language (n=6), health status (n=4), ADL limitations (n=4), current risk for depression (n=4), assistance available (n=9), length of time in NYCHA housing (n=1).

^b weighted survey data

TABLE 4 Predictors of senior center use and frequent senior center attendance—best-fit models

	p-value ^b	Prevalence			
		Ratio	95 % Confidence Limits		
Senior Center Use among All Seniors (n=970)					
Race/Language Category					
Asian, Chinese	0.001	2.44	1.47	-	4.05
Black, English	0.004	1.72	1.20	-	2.49
Hispanic, English	0.015	1.69	1.11	-	2.59
White, English	0.264	1.38	0.79	-	2.40
White, Russian	0.751	1.11	0.58	-	2.11
Hispanic, Spanish	—	ref	—		—
Household Size					
Lives Alone	0.034	1.26	1.02	-	1.56
Lives with Others	—	ref	—		—
Development Type					
Senior-Only	<0.001	1.56	1.24	-	1.95
Mixed or NORC	0.009	1.44	1.10	-	1.89
Family, non-NORC	—	ref	—		—
Age and ADL Limitations (reference is age 65–74, no ADL limitations)					
ADL Limitations					
Aged 75 and older ^a	0.017	1.01	0.80	-	1.45
Aged 65-74	0.207	1.23	0.89	-	1.69
No ADL Limitations					
Aged 75 and older	0.001	1.45	1.18	-	1.80
Aged 65-74	—	ref	—		—
Current Risk of Depression					
At Risk	0.024	1.29	1.04	-	1.61
Not At Risk	—	ref	—		—
Frequent Senior Center Use among Seniors using Senior Centers (n=313)					
Race/Language Category					
Black, English	0.110	1.60	0.90	-	2.85
Hispanic, English	0.020	2.02	1.12	-	3.66
Hispanic, Spanish	0.003	2.41	1.36	-	4.25
White, English	0.071	1.84	0.95	-	3.58
White, Russian	0.053	1.92	0.99	-	3.73
Asian, Chinese	—	ref	—		—
Race/Language Category (alternate reference)					
Black, English	<.0001	0.67	0.56	-	0.79
Hispanic, English	0.014	0.84	0.73	-	0.97
Hispanic, Spanish	—	ref	—		—
Gender					
Female	0.012	1.33	1.064	-	1.660
Male	—	ref	—		—
Income Level					
<100 % Poverty Level	0.182	1.29	0.89	-	1.87
100 %-200 % Poverty Level	0.498	1.15	0.76	-	1.74
>200 % Poverty Level	—	ref	—		—

^a p-value for interaction term

^b weighted survey data

being at current risk for depression. There was a significant interaction ($p=0.017$) between age group and ADL limitations. Among those without any ADL limitations, seniors aged 75 and older had a higher prevalence of senior center use than those aged 65–74, but no age differences were observed among those with at least one ADL limitation. Neither age nor ADL limitations were significantly related to senior center use in the final model without including the interaction term. Gender was not significantly associated with senior center use when added to the final model. The QIC goodness of fit statistic for this model was 1159.95 and the c-statistic (AUC) from tenfold cross-validation was 0.627.

Regression Results: Frequent senior center attendance

A second model was constructed to predict frequent senior center attendance among those who reported using a senior center in the past 3 months. This model included race/language, gender, and income level (Table 4) as significant predictors of frequent attendance. The prevalence of frequent senior center attendance was highest among Hispanics interviewed in Spanish (the group with the lowest overall rate of *any* senior center use) and was lowest among Chinese-speaking Asians (PR = 2.41; 95 % CI: 1.36–4.25 comparing these groups). Hispanics interviewed in Spanish also had a significantly higher prevalence of frequent attendance than both non-Hispanic Blacks and Hispanics interviewed in English. Women had a higher prevalence of frequent attendance than men (PR = 1.33; 95 % CI: 1.06–1.66). Income was not significantly related to frequent attendance, but adjusting for income increased the apparent association between race/language and senior center use for all groups. The QIC goodness of fit statistic for this model was 400.00 and the c-statistic (AUC) was 0.561.

DISCUSSION

We found that approximately one in three older public housing residents in NYC used senior centers, and one in five used them frequently. This is a much higher level of use than found in a 1984 national survey, where 14 % of older adults overall reported using a senior center in the past year.⁷ Our analysis showed that older NYCHA residents who lived alone and those at risk for depression as indicated by the PHQ-2 screen were more likely to be senior center users, indicating some success at reaching potentially isolated public housing residents. Unlike prior studies, we also found that men were as likely to use centers as women in this heavily female population, although they tended to visit less frequently. While some researchers and senior center stakeholders have noted lower senior center attendance among “younger” seniors (those aged 65–74),^{5,17,28} we found this to be the case only among those with no ADL limitations.

In this population, English-speaking non-Hispanic Blacks and Whites had similar prevalences of any senior center use, while Spanish-speaking Hispanics had a lower prevalence of use (differences that persisted even after controlling for potential confounders). Among Hispanics, we found that taking the survey in English strongly predicted use of senior centers even after adjusting for birthplace and length of time in NYCHA housing (data not shown). However, among those attending senior centers, frequent attendance was more common among Hispanics interviewed in Spanish than among other race/ethnic groups. Prior studies on race/ethnicity and senior center use have had inconsistent results.^{7,8,11,29} This may be because the communities studied differ substantially from each other and from the urban public

housing population we surveyed, or because the cultures and orientations of senior centers can vary between different locations. Our findings suggest that the factors driving first use or occasional use of a service may be different than those determining frequent or regular use. In NYC, language proficiency might be a significant barrier to first using senior centers for Hispanics, despite efforts to provide English/Spanish bilingual materials and staff. Spanish-speaking Hispanics may have substantial unmet need for senior center services, since our data show that once they become senior center users they are likely to attend frequently. Race/language groups may also differ in their levels of interest in senior center activities offered, opportunity for socialization outside of senior centers, and knowledge about senior centers.

Senior center use was more common in our study among adults living in senior-only or mixed/NORC public housing developments compared to those in family developments. Residents of senior-only developments and buildings have chosen to live with other older adults, presumably in order to benefit from social opportunities and/or services. Case-management and crisis intervention services are provided to residents, and a system of floor captains ensures that residents are in contact with one another and are not isolated. Available services, self-selection, and/or a sense of community fostered by a high proportion of seniors may be responsible for the elevated prevalence of senior center use at NORCs and senior-only/mixed developments. Residents of developments with higher proportions of seniors may also have more opportunity to learn about the centers through word-of-mouth.

In multivariable analysis, we found that older adults living alone had a higher prevalence of senior center use, consistent with the findings of Krout et al. (1990).⁷ Seniors living alone may have greater need for senior center services because they might otherwise be at risk of social isolation. We also found a higher prevalence of senior center use among older adults at current risk of depression. In contrast, in a random sample of Missouri seniors, Calsyn and Winter (1999) found that senior center users had better mental health than seniors not using centers.¹⁰

By definition, NYCHA residents have low/moderate-incomes. In this population, we did not find a higher prevalence of senior center use among residents in the lowest-income category, as consistently seen in the literature.^{7,8,12,25,30} However, the NYCHA population has a lower income overall than most other groups that have been studied. We did find that, among senior center users, older adults with incomes below the federal poverty line were more likely to visit centers frequently, potentially indicating greater need for services. Public housing residents with very low incomes may have greater need for senior center services because they lack alternate low-cost activities¹² or have a greater need for the specific resources available there,⁹ such as free meals and assistance with social services and benefits. In a study of senior center attendees in Arizona, Fitzpatrick et al. found that low-income seniors had greater self-perceived benefits from the centers than seniors with higher incomes.¹³

The strengths of this study lie in the representativeness of the survey and linkage with administrative data to examine the experience of a well-delineated, at-risk population – older adults living in urban public housing – and identify opportunities for improved targeting of senior center services. Results from the cross-validation analysis indicated that our models had moderate accuracy to predict senior center use, suggesting that unmeasured variables also influence the likelihood of senior center attendance. Additional limitations include potential sources of error for several of the variables. Our survey questions were not independently validated in the different languages the survey was administered in, which limits the known

validity of the language findings. NYCHA's TDS only reports on the "authorized" residents that are listed on the apartment lease, which may lead to an under-reporting of the number of people actually living in the household. This under-reporting of household size may have led us to underestimate the effect of living alone on senior center use. All data on health and mental health was self-reported, which may have increased measurement error or led to biases. A limitation to our finding on mental health is that the PHQ-2 screen contains only two questions and may have a limited ability to identify seniors with depression.

We found that older public housing residents in New York City have relatively high rates of senior center use across lines of gender, health status, and age. This is evidence that senior centers may be an appropriate setting for health promotion activities targeting low-income older adults. We also found a lower prevalence of use among Hispanics who were interviewed in Spanish, indicating that language preference can be an important determinant of senior center use. Additional outreach may be needed in this population in New York City. This finding underscores the importance of examining the impacts of both race and language on service utilization in communities with significant immigrant populations. Older adults living in public housing developments with a high proportion of older residents had a high rate of senior center use. Outreach services are provided in these developments, and may help to inform residents about senior center services. We suggest that extending outreach services to a wider range of seniors and increasing publicity efforts for senior centers might help to increase attendance. Our findings demonstrate the importance of community context and outreach to senior center use and have the potential to inform efforts to reduce barriers to service utilization among at-risk urban seniors.

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