The Effectiveness of Peer-to-Peer Community Support to Promote Aging in Place

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Statistical Considerations

In this section, we outline in detail the strengths of our proposed sampling and analysis plan and how it is designed to address and minimize the potential limitations of our study design. Specifically, we elaborate on how we plan to make our samples in the peer-support and standard community services group comparable, despite the fact we cannot randomize all participants; how we will control for differences across sites in our analyses; and how we will deal with missing data (including loss to follow-up).

Analysis Plan The mixed experimental and quasi-experimental, matched group comparison design allows us to conduct three different analyses to accomplish both Aims 1 and 2: (1) comparing the effectiveness of peer support to standard community services at 6 months combining data from all three sites; (2) analyzing the data from AJFCS and the combined data from the other two sites to assess the internal consistency of the effectiveness across the randomized and non-randomized designs but also to assess whether the effect size is different between the two components of the study design; (3) analyzing data from AJFCS to test whether peer-support is more effective when provided for 12 months compared to 6 months. For the third analysis using AJFCS data only, we will compare 12 vs. 6 month "dose"-levels of the peer-to-peer support intervention changes in the rates of health care utilization and nursing home placement and self-rated health, wellness, depression, and anxiety of between baseline and 12 months in group randomized to get peer support relative to changes in these same measures between 6 and 12 months in the group randomized to standard community services; as reminder this group received standard services for 6 months and then transitioned into receiving peer-support between 6 and 12 months (see Figure 3).

The primary analyses for comparative effectiveness will be based on two-sample independent tests such as t-test, Wilcoxon rank sum test, Fisher's exact test or chi-square test of the outcome measures. The choice of analytic method will depend on whether the outcome measures are continuous or categorical. These tests will be performed at a two-tailed significance level of 0.05 without adjustment for multiplicity. Health care utilization and nursing home placement rates and self-rated health, wellness, depression, and anxiety between the two groups will be compared using a two-sample test again at a two-tailed significance level 0.05.

Subsequent to the primary analyses, regression analyses will be performed for the same outcome measures adjusting for stratification factors and other potential confounders that might influence the outcomes, including an indicator for site. Linear or generalized linear models such as logistic and Poisson regression models will be used depending on the outcome measures. As the intermediary measures of health and overall wellness such as self-rated health, depression, and anxiety in Aim 2 may serve as important mediators of the effect of the peer-to-peer support intervention on the primary outcomes measures in Aim 1, we will use exploratory mixed-effects regression techniques and structural equation models to test and quantify whether and to what extent the effect of the intervention is mediated by intermediary measures of health and overall wellness. We expect missing data due to random drop-out of participants before month 12 and to a lesser extent loss due to death of participants before month 12. Missing data will be handled as per the recent National Research Council report on the topic.[77] Death before month 12 will be considered a competing event, and will be handled using the appropriate method.[78]

Given the diverse nature of our sample, we plan to carry out the statistical analyses for Aims 1 and 2 for a limited number of subgroups. We will conduct subgroup analyses based on race/ethnicity (African American, Hispanic and non-Hispanic White), gender (male vs. female), age group (< 70, 70-80 and ≥ 80 years), and language (English- vs. Spanish-speaking) and by the three sites. These subgroup analyses will be conducted to evaluate the internal consistency of intervention effect, and subgroup by intervention interaction tests will be used to assess the internal consistency.

Randomization and matching In order to reduce potential bias further, participants from the AJFCS of Palm Beach will be allocated either to peer-to-peer support (Intervention) or standard community support (Control) in a 1:1 ratio using permuted block randomization, stratified by age, gender and race/ethnicity. Barring randomization in JFS of LA and Community Place of Greater Rochester, older adults already participating in peer-to-peer support and those on the waiting list will be matched on age, gender and race/ethnicity to mitigate potential differences between the two groups. In order to avoid reporting/ascertainment bias, calls will be made to all participating older adults and support staff at 3 and 9 months as outlined in Figure 4 above.

Sample Size Justification Given the total sample size of 720 at-risk older adults, the study has 0.80/0.85/0.90 power to detect the effect size of 0.209/0.223/0.242 for the primary outcome measure of the annualized rate of hospitalization, ED use and institutionalization at a two-tailed significance level 0.05. The effect size here is defined as the difference in the mean annualized rate of hospitalization, ED use and institutionalization between the two groups divided by the standard deviation of the annualized rate assumed to be common in the two groups. Due to random drop-out or loss to competing event of death, the study will have less power to detect the stated effect sizes or will have the stated power for larger effect sizes.