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# The Impact of Peer Support on the Risk of Future Hospital Readmissions among Older Adults with a Medical Illness and Co-Occurring Depression

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**Abstract:** Older adults account for 60% of all preventable hospital readmissions. Although not all readmissions are preventable, evidence indicates that up to 75% of hospital readmissions can be prevented with enhanced patient education, pre-discharge assessment, and effective care upon discharge. Social support, specifically peer support, after discharge from hospital may be a crucial factor in minimizing the risk of preventable hospital readmission. The pilot study reported here evaluated the relationship between peer support and hospital readmissions in a sample of depressed older adults (N = 41) who were recently discharged from hospital due to a medical condition and who simultaneously had an untreated mental health diagnosis of depression. As hypothesized, participants who received the 3-month long peer support intervention were significantly less likely to be readmitted compared to those who did not receive the intervention. Findings from this preliminary information suggest that peer support is a protective factor that can positively affect patient outcomes, reduce the risk of hospital readmission, and reduce depressive symptoms among older adults with health and behavioral health comorbidities.

**Keywords:** hospitalization; readmission; peer support; disparities; depression

## 1. Introduction

The Centers for Medicare and Medicaid Services (CMS) define a readmission as an admission to a subsection hospital within 30 days of a discharge from the same or another subsection hospital (CMS 2012). A readmission is considered potentially preventable if there was a reasonable expectation that it could have been prevented. Preventable hospital readmissions represent a critical failure of the healthcare system, have a negative impact on patient outcomes, and are the single largest driver of excess healthcare costs (Burton 2012). For patients, hospital readmission increases the risk for complications, infections, and functional impairment (Krumholz 2013; Forster et al. 2004; Cuffel et al. 2002). This risk is heightened among older adults (aged 65 and older) whom account for nearly 60% of all preventable hospital readmissions (Hamilton et al. 2015; Schwarz 2000). Preventable hospital readmissions are also tremendously expensive, consuming a disproportionate share of expenditures for inpatient hospital care. One landmark study indicated that nearly 20% of Medicare beneficiaries were re-admitted within 30 days after discharge at an annual expense of $17 billion (Jencks et al. 2009).

The presence of a co-occurring depressive disorder can significantly affect the rates of hospital readmission. More than 68% of adults with a mental health condition report having at least one general medical disorder, and 29% of those with a medical disorder have a comorbid mental health

condition (Goodell et al. 2011). Patients with comorbid depression and chronic conditions such as diabetes and cardiovascular disease have higher risks of medical complications (Lin et al. 2010), hospitalizations (Davydow et al. 2013), mortality (Leung et al. 2012), and have annual healthcare costs that are twice as high as patients with chronic medical conditions alone (Katon et al. 2003). Further, comorbid depression can exacerbate medical symptoms and impair self-care for acute medical conditions (e.g., adherence to medication, diet, and exercise), which significantly increases the risk of hospital readmission. Specifically, research suggests that patients with a comorbid depressive disorder are three times more likely to be readmitted to hospital within 90 days (Kartha et al. 2007).

While not all readmissions are entirely preventable, randomized prospective trials indicate that up to 75% of hospital readmissions can be prevented with enhanced patient education, pre-discharge assessment, and effective care upon discharge (Benbassat and Taragin 2000). Healthcare service delivery systems can impact patient readmissions by addressing modifiable risk factors including the quality of care (degree to which health care services increase the likelihood of desired health outcomes) that is provided to patients, the social support received during their hospital stay, and the interventions provided during the period of discharge back to the community (Parrish et al. 2009). Interventions provided during the period of discharge from hospital back to the community have been identified as transitional care interventions and are initiated before hospital discharge to ensure the safe and effective transition of patients from the acute hospital setting to home. Transitional care interventions target modifiable hospital readmission risk factors by improving the coordination of healthcare services for vulnerable populations upon hospital discharge and enhancing patients' ability to engage in the effective self-management of chronic disease (Verhaegh et al. 2014). Such approaches have shown particular success in older adults with chronic medical conditions or specific illness groups (e.g., diabetes and cardiovascular disease) (Leppin et al. 2014; Piraino et al. 2012; Rennke et al. 2013). Several specific interventions have shown efficacy in reducing preventable readmissions, including the Community-Based Transitional Care Program (Kocher and Adashi 2011), Geriatric Resources for Assessment (Counsell et al. 2006), the Bridge Model (Alvarez et al. 2016), and the Care Transitions Intervention (Coleman et al. 2004). These models typically include care coordination by a nurse or social worker, communication between the primary care provider and the hospital, and a home visit within three days following discharge. These strategies, however, are costly and require additional highly trained personnel and, consequently, they have been difficult to sustain. Some studies have integrated the use of peer mentors to reduce costs and improve self-care in recently discharged patients, however they have not examined its effect on hospital readmissions (Riegel and Carlson 2004).

Social support after discharge from hospital may also be a crucial factor in minimizing the risk of preventable hospital readmissions. One such type of support is peer support. Our research team has developed and pilot-tested a peer support (PS) intervention that was designed to provide the extra support that depressed older adults need after acute hospitalization and is based upon the principles of motivational interviewing. Motivational interviewing is a person-centered, goal-directed method for enhancing intrinsic motivation for change by exploring and resolving ambivalence (Miller and Rollnick 2012). The strategies and techniques of Motivational Interviewing (MI) are utilized by Peer Educators (PEs) to better understand the worldview and culture of the study participants and to help guide them toward decisions about self-care, symptom management, and help-seeking that is consistent with their own goals and values. Our novel peer support intervention is delivered by PEs, who are individuals that are trained to provide support and to deliver educational information to a specific group of people within their community whom they are similar to in age, ethnicity, and/or social background (Ho 2007; Klein et al. 2014). PEs who work with the mentally ill population have also personally experienced mental illness and are currently in recovery. These PEs have demonstrated significant psychiatric improvements, have first-hand experience with the mental health service delivery system, and serve as a source of support and encouragement for those who are currently dealing with a mental health diagnosis (Davidson et al. 2006; Joseph et al. 2001).

Mental health programs are increasingly developing service delivery roles for people who have experienced recovery from a mental illness. One of the many benefits of using PEs is the efficient and cost-effective way to tailor community health programs to meet the needs of individuals, particularly vulnerable populations, such as older adults, racial/ethnic minorities, and adults living with comorbid medical illness and depression (Joseph et al. 2001). PEs are readily accessible, provide unique access to the target community by being familiar with the common vernacular, have established connections, and can be an influential example for change (Hughes-d'Aeth 2002)—all of which would be difficult for a healthcare provider or an outsider of the community to be or obtain. Research suggests that across a variety of settings, PEs provide credible, practical assistance to help patients to initiate and maintain daily behavioral patterns that are central to managing their chronic disease (Ho 2007; Norris et al. 2006; Brownstein et al. 2007; Walker and Bryant 2013).

While the positive impact of peer support is well-documented, there is a dearth of research which has examined the impact of peer support post hospital discharge on hospital readmissions. The current pilot study evaluated the relationship between peer support and hospital readmissions in a sample of older adults who were recently discharged from hospital due to a medical condition and who simultaneously had an untreated mental health diagnosis of depression. We hypothesized that study participants who received the peer support intervention would be less likely to be readmitted (at 30 days, 90 days, and 12 months) compared to a non-equivalent comparison group of study participants who did not receive this intervention, yet were followed for the same length of time and were assessed at similar time points.

## 2. Materials and Methods

Study participants were recruited from three community-based primary care centers located within an Eastern city of the United States. These centers were selected due to their large population of older patients and them having a specific interest in addressing the issues of hospital readmissions. Staff members referred individuals to the research team who met the study criteria: 60 years old and older, had recently been discharged from the hospital due to a medical condition (within the last 30 days; average time from discharge to study initiation was 2 weeks), and had a diagnosis of depression (per hospital records). Participants were excluded from the study if they had a co-occurring substance use disorder, were actively suicidal, or had an organic brain disorder, dementia, or other significant cognitive impairment. All nursing and case management staff at each center met with the study team before recruitment to learn more about the project, to ensure their understanding of the recruitment criteria, and to develop an excitement about being involved in the project. All of the patients who were referred by the staff who met the study criteria were invited to participate in the study. An effort was made to over sample racial/ethnic minorities to ensure that they were represented in our sample. Ultimately, a total of 65 older adults who met the study criteria were referred to the research team over a period of 8 months. After their referral, the study project coordinator met with the participants in their homes to explain the study and to obtain informed consent. A total of 21 older adults who met the criteria gave informed consent to work with a peer educator (PE) in the current study. Of the remaining referred potential participants (44 older adults), 24 refused to participate in the study. Primary reasons for not participating in the current study included patients already having a post-discharge treatment plan with another organization and not wanting to be a part of a study that was focused on mental illness due to concerns about stigma. The remaining 20 chose not to work with the PE but were willing to be followed, to participate in follow-up assessments, and to grant the team access to their medical records, thus becoming a non-equivalent comparison group. Primary reasons for not wanting to work with a PE were due to concerns about stigma and participants' non-acknowledgement of having a depressive disorder, despite them having a current diagnosis of depression as per their medical records and scoring high on our depression screener.

Participants were compensated $100 upon their completion of the pre-post intervention assessments, which occurred at baseline, 30 days, 90 days, and at 12 months. This is a very modest payment for the participants' time and was not a substantial financial incentive to affect the participants'

responses to the assessment materials. The study participants completed a brief questionnaire immediately following successful screening into the study at baseline (before initial contact with their peer educator), at 30 days, and at 90 days (following the completion of the 3-month PE intervention). This study was approved by the University of Pittsburgh Institutional Review Board.

## 3. Peer Educators (PEs)

Eight older adults (2 males, 6 females, aged 61–91 years old) who had previously experienced a self-reported depressive episode but had received treatment to ameliorate their diagnosed depression, and who were currently in recovery, were recruited and were trained to be PEs and to deliver a peer support intervention. These PEs were identified by the individual primary care centers in an effort to ensure that the PEs were living in the same communities as the study participants. The PEs were recruited from direct staff referral, word of mouth, and from flyers that were strategically placed in the community centers. Eligibility requirements for becoming a PE included a high school education, effective communication and listening skills (assessed by the Principal Investigator during an in-person interview where the potential PEs asked to talk about their experience with depression and treatment seeking), and willingness to complete all five sessions (20 h in total) of a manualized training protocol that comprised of lectures, role play, and group discussion (see Table 1 for a description of the PE training). In total, 10 PEs were referred to our project and all 10 began the PE training, however only eight completed the training. PEs do not function as mental health counselors, and this was emphasized during the training. PEs were trained to use Motivational Interviewing techniques (e.g., open-ended questions, reflective listening, reframing) to assess the participants' needs, to provide accurate information about depression and treatment, to discuss their own experience with depression, and to provide social and emotional support. These motivational interviewing techniques were used to enhance the ability of the PEs to listen non-judgmentally and to provide support as opposed to problem solving or giving clinical advice. The PEs were also instructed to provide social support and information regarding community-based supports and resources (see Table 2 for a description of the Peer Support Intervention). The peer support intervention was not manualized. The PEs were instructed to use their training to meet the participants' needs using a person-centered approach. The PEs were matched to study participants on the following criteria: age group, neighborhood, and participants' preference for gender and race. The PEs were required to meet with the study participants a minimum of three times (at least once in person) over a three-month period. There was no upper limit to the amount of contacts, and all of the contacts beyond the three meetings were initiated solely by the study participants. As such, greater than three contacts served as an indicator of intervention acceptability. The PEs were paid modestly for each interaction with the participants ($25 for in an person visit, $15 for telephone contact).

**Table 1.** Peer Educator Training Protocol.

| Session | Training Topics | | Learning Methods | |
| --- | --- | --- | --- | --- |
| Session One (4 h) | (1.) | What does it mean to be a peer educator? | (1.) | Lecture |
| | (2.) | Depression | (2.) | Lecture |
| | (3.) | Depression and Aging | (3.) | Lecture and video |
| | (4.) | Confidentiality and boundaries | (4.) | Group Exercises |
| Session Two (4 h) | (1.) | Communication training | (1.) | Role-Play |
| | (2.) | Depression and chronic illness | (2.) | Lecture |
| | (3.) | Engaging in mental health treatment | (3.) | Lecture and Discussion |
| | (4.) | Communicating with health care providers | (4.) | Lecture and Role-Play |
| Session Three (4 h) | (1.) | Appropriate use of self-disclosure | (1.) | Lecture and group exercises |
| | (2.) | Listening and feedback strategies | (2.) | Role-Play |
| | (3.) | Self-disclosure of personal experiences to reduce stigma | (3.) | Group exercise and role-play |
| Session Four (4 h) | (1.) | Crisis Management | (1.) | Lecture and exercises |
| | (2.) | Recovery | (2.) | Lecture |
| | (3.) | Identification of red flags | (3.) | Group exercise |
| | (4.) | Introduction to Motivational Interviewing | (4.) | Lecture |
| Session Five (4 h) | (1.) | Using Motivation Interviewing to enhance positive health behaviors | (1.) | Lecture and role-play |
| | (2.) | Writing an effective contact note | (2.) | Group exercise |
| | (3.) | How to identify community resources | (3.) | Lecture, group exercise, and receive a community resource guide |

**Table 2.** Peer Support Intervention Steps.

| | |
|---|---|
| **(1.) Reinforce Information Provided in Hospital Discharge Plan** | • Participant Goals Reviewed <br> • Review Patient Health Record <br> • Work through barriers and challenges to prescribing doctor's recommendations |
| **(2.) Provide Information and Support** | • Provide additional information about mental health and physical health diagnosis <br> • Discuss challenges in the participant's transition from the hospital <br> • Connect participant to community-based supports to expand social network |
| **(3.) Utilize Motivational Interviewing Strategies** | • Focus on participant enactment of positive health behaviors (i.e., taking medications as prescribed, healthy diet, exercise, sleep, following up with physician appointment) <br> • Self-disclosure of personal experiences to reduce stigma |
| **(4.) Modeling of Empowerment and Control over Health Outcomes** | • Role-play interactions with providers <br> • Assist participant develop a list of questions/concerns to discuss with healthcare providers (i.e., red flags, medication side effects etc.) |
| **(5.) Connect Participant with Available Community Resources** | • Senior centers, support groups, culturally-based support services <br> • Accompany participant to community resources to provide support (if necessary) |

Peer Educators were responsible for writing comprehensive contact notes which outlined in detail their interaction with their participants, and these were submitted for review by the PI and clinical staff. These notes served as indicators of the actual support activities the PEs were providing to the participants. The PEs also attended bi-weekly supervision meetings with project researchers/clinicians to discuss current cases, to obtain critical feedback, and to receive additional education. To monitor the potential effects of PEs experiencing depressive symptoms while working with the study participants, depression symptoms were screened bi-weekly during routine supervision. The PEs would be provided with a temporary break from the study as a result of a positive depression symptom screen, however, none of our trained PEs had a spike in depression symptoms during the current study.

## 4. Measures

Demographic characteristics: Self-reported demographic characteristics (collected via survey at baseline using a demographic questionnaire) included: age, gender, race, marital status, education, and employment status.

Clinical characteristics: The Patient Health Questionnaire (PHQ-9; Kroenke et al. 2001) was used to assess the severity of depressive symptoms at screening, baseline, and follow-up assessments. This instrument has excellent sensitivity to change in depressive symptomatology over time. Higher scores indicate more severe depressive symptoms.

Hospitalization: Hospital medical records and administrative data were utilized to identify current somatic and psychiatric medical conditions, including the cause of the initial hospitalization, subsequent readmissions (at 30 days, 90 days, and 12 months), and time spent in hospital.

## 5. Data Analysis

Data analysis was conducted using SPSS version 22.0 (IBM 2011). Descriptive statistics are reported as frequencies and percentages for categorical variables. Pearson correlation coefficient values were utilized to examine the univariate relationships between demographic characteristics (e.g., age, race, and gender) and the length of hospital stay and depressive symptoms. Phi or mean square contingency coefficients were utilized to examine the relationships between variables of interest (e.g., demographic characteristics and the number of PE contacts) with the binary variable of hospital readmissions. Readmissions data were analyzed using chi-square ($\chi^2$) tests to determine differences in hospital readmission rates among the participants who received the peer support intervention as compared to the non-equivalent comparison group at 30 days, 90 days, and 12 months. Paired samples T tests were utilized to examine the differences in the mean depression symptom scores at baseline and at 90 days (pre-and post PE intervention) for both the intervention group and the comparison group. Prior to analysis, the data were tested for the absence of outliers and multi-collinearity, homoscedasticity of residuals, and independence of error terms. All of the data were normal and no additional adjustments were needed. Estimates of internal consistency for the PHQ-9 was an acceptable 0.904.

## 6. Results

As shown in Table 3, in both the group who received the peer support intervention and the non-equivalent comparison group, most of the study participants were women, with a mean age of 65, and had completed high school, with a few having at least attended some college. The participants were mostly employed full-time or were retired. The most common medical conditions that were identified as the reason for the participants' initial hospitalization and subsequent re-hospitalization were diabetes (35%), cardiovascular disease (32%), and chronic obstructive pulmonary disease (17%). Additional medical conditions included high blood pressure (8%), arthritis (5%), and pneumonia (3%). While all of the participants had a diagnosis of depression (per their medical records), most of the participants identified moderate depressive symptoms at the baseline assessment, as per the PHQ-9 ($M = 12$, $SD = 5.78$). None of the participants were currently in treatment, nor had they received treatment for their depression in the previous six months.

**Table 3.** Sample Characteristics by Group.

|  | Total (*N* = 41) | *n* (%) | Peer Support (*n* = 21) | Comparison Group (*n* = 20) | Mean |
|---|---|---|---|---|---|
| Gender |  |  |  |  |  |
| Female | 27 (66) | 14 | 13 |  |  |
| Male | 14 (34) | 7 | 7 |  |  |
| Race |  |  |  |  |  |
| Non-Hispanic White | 23 (46) | 12 | 11 |  |  |
| African American | 18 (44) | 9 | 9 |  |  |
| Age |  |  |  |  | 65 (SD = 4.67) |
| 60–63 | 18 (44) | 9 | 9 |  |  |
| 64–66 | 14 (34) | 8 | 6 |  |  |
| 67+ | 9 (22) | 4 | 5 |  |  |
| Marital Status |  |  |  |  |  |
| Married | 17 (41) | 8 | 9 |  |  |
| Single | 10 (24) | 5 | 5 |  |  |
| Divorced | 6 (15) | 4 | 2 |  |  |
| Widowed | 8 (20) | 4 | 4 |  |  |
| Education |  |  |  |  |  |
| High School graduate | 38 (93) | 19 | 19 |  |  |
| Completed some college | 3 (7) | 2 | 1 |  |  |
| Employment |  |  |  |  |  |
| Unemployed | 8 (20) | 4 | 4 |  |  |
| Retired | 12 (30) | 6 | 6 |  |  |
| Working full-time | 12 (30) | 6 | 6 |  |  |
| Working Part-time | 7 (17) | 4 | 3 |  |  |
| Disabled | 2 (3) | 1 | 1 |  |  |
| * PHQ-9 Scores |  |  |  |  | 12 (SD = 5.78) |
| 10–14 | 30 (73) | 15 | 15 |  |  |
| 15–19 | 8 (20) | 5 | 3 |  |  |
| 20+ | 3 (7) | 1 | 2 |  |  |
|  |  |  | Mean (12) | Mean (12) |  |

*Note.* * PHQ depression symptoms: minimal (score 1–4), mild (score 5–9), moderate (score 10–14), moderately severe (score 15–19), severe (score 20–27).

Participants who received the peer support intervention were less likely at each time point to be readmitted to hospital than the participants in the non-equivalent comparison group who did not receive the intervention. At 30 days post-hospitalization, participants who received the peer support intervention were less likely to be readmitted ($p = 0.042$). At 30 days, there were no hospital readmissions in the intervention group, while 10% of the participants were readmitted in the comparison group. At 90 days, participants who received the peer support intervention were less likely to be readmitted ($p = 0.045$). Specifically, 10% of participants in the intervention group

were readmitted, while 20% of the participants in the comparison group had been readmitted At the one-year follow-up, participants who received the peer support intervention were less likely to be readmitted ($p = 0.027$). At 12 months, only 14% of the participants in the intervention group had a hospital readmission as compared to 35% of the participants in the comparison group (see Table 4). Gender and age were not related to hospital readmission rates, however, the older the participant, the longer they were likely to have been in the hospital if readmitted. For the participants who were readmitted, the average length of the hospital readmission stay was 4 days for participants who were older than 70 and 2 days for participants who were younger than 70.

**Table 4.** Number of Hospital Readmissions Post-Intervention.

| Time Post Hospitalization | Number of Hospital Readmissions | | |
| --- | --- | --- | --- |
| | Intervention Group ($n = 21$) N (%) | Comparison Group ($n = 20$) N (%) | *p*-Value |
| 30 days | 0 (0%) | 2 (10%) | 0.045 |
| 90 days | 2 (10%) | 4 (20%) | 0.042 |
| 12 months | 3 (14%) | 7 (35%) | 0.027 |

\* Readmissions reported at each time-point do not include readmissions from previous time-points.

For the individuals who received the peer educator intervention of at least three contacts within the three-month period, a sub-analysis showed no association between the number of peer support contacts and hospitalization outcomes. The average number of contacts between the peer educator and the participants was approximately 12 or once per week for the duration of the 3 months. In person contacts averaged at one hour and telephone contacts averaged 25 min. While there were no differences in the depression symptom severity at baseline, participants who received the peer support intervention demonstrated a significant reduction of depressive symptoms ($M = 12$ at baseline; $M = 8$ at follow-up) at 90 days post the PE intervention ($p < 0.05$), while symptoms in the comparison group remained largely unchanged ($M = 12$).

## 7. Discussion

The current study evaluated the relationship between peer support and hospital readmissions in a sample of depressed older adults who were discharged from hospital due to a medical condition and who simultaneously had an untreated mental health diagnosis of depression. Using a non-equivalent comparison group, we compared the rates of hospitalization and the average length of treatment stay between recently discharged patients who received a 3-month peer support intervention and those who did not receive any intervention. As hypothesized, participants who received the 3-month long peer support intervention were less likely to be readmitted compared to those who did not receive the intervention. This result provides preliminary information to suggest that peer support is a protective factor that can defend against future hospital readmissions for at-risk elders.

Our study supports an emerging body of literature on the range of health related outcomes that are impacted by peer support. Sledge and colleagues (Sledge et al. 2011), suggest that peer support can in fact reduce the risk of future inpatient psychiatric hospitalization among adults who are living with mental illness. While peer support has gained popularity in terms of evaluating its effectiveness, peer support in general, and particularly among older adults, is not new. Prior to formal peer service programs, this population of older adults with untreated depression may not have had access to and/or may not have been interested in participating due to stigma. As a result, they may have relied on peers (e.g., neighbors, faith leaders) to help. Thus, it should not be surprising to see this effect.

When examining whether demographic factors were related to our outcomes of interest, we observed that African American participants were more likely to be re-hospitalized as compared to their non-Hispanic White counterparts, however this relationship was not significant. Further research should examine intervention effects by race and ethnicity in a larger study with adequate representation

of racial and ethnic minority participants. Gender and age were not statistically significantly related to hospital readmission rates, however the older the participant, the longer they were likely to have been in hospital if they were re-hospitalized. This is also not surprising since older age increases the risk for multiple chronic conditions and disability (Parchman and Culler 1999). We also found that although there were no differences in the depression symptom severity at baseline, the participants who received the peer support intervention had significantly reduced depressive symptoms at 90 days post hospital discharge, while the symptoms in the comparison group remained largely unchanged. This suggests that one potential mechanism for peer support to affect outcomes and to potentially reduce the risk for hospital readmission is through a reduction in depression symptoms. This mechanism should be tested in a larger research trial.

This pilot also intended to assess intervention feasibility and acceptability. Participants who received the peer support intervention had to meet with their PE a minimum of three times. All other contacts were at the initiation of the study participants. In our study, the average number of contacts between the PE and the study participants was 12, or once per week for the duration of the 3 months. Further, all of the participants completed the study and all of the follow-up assessments. This is a strong indicator for intervention feasibility and acceptability. There were, however, a large number of participants who initially declined to be a part of the study or to work with a PE. One of the primary reasons that was given for the lack of research participation was an aversion to research in general. While the reasons for lack of participation were largely out of the research team's control, this suggests that additional research is needed to address the barriers to research participation among high-risk populations who are particularly vulnerable to stigma, mis-trust, and who do not identify with having mental illness despite having a current psychiatric diagnosis.

There are several limitations to discuss. First is the small number of participants in this investigation. This was a pilot study that was intended to provide preliminary evidence about the feasibility and acceptability of a peer support intervention led by PEs to improve outcomes among a sample of recently discharged older adults living with medical illness and co-morbid depression. Therefore, our sample is not likely to be representative of all older adults being discharged to the community. Second, while we did not find any evidence of a systematic difference between those who received the peer support intervention and the non-equivalent comparison group, there was no randomization to the groups. Therefore, we cannot make any causal inferences about the differences in the hospital readmission rates being attributed solely to the peer support intervention. Further, given that our non-equivalent comparison group was comprised of participants who met the criteria for the study but who chose not to work with a PE, there may be fundamental differences between the two groups that led to their decision to be a part of the research but not to take part in the intervention. This group also had more concerns around stigma and being labeled with depression, which suggests that there were potential differences between the groups which could have affected the outcomes. There was also a large group of individuals that declined all aspects of study participation whose outcomes we could not assess. There are also many other variables, such as the severity of the medical condition and previous hospitalizations, which affect hospital re-admissions that this study did not measure. Because of these limitations, we do not assert that the results can be generalized to other settings or to a general population of recurrently admitted patients.

Despite these limitations, this study has significant strengths. This study examined the impact of peer support on the rates of hospital readmissions among a highly vulnerable sample of older adults living with a medical illness and a co-occurring depression diagnosis. Given the importance of identifying strategies that can affect hospital readmissions, this pilot study provides preliminary evidence that peer support needs to be investigated further concerning these outcomes. In addition, many studies of hospital readmission focus on 30-day readmissions because this is the time-window that is focused on by the Hospital Readmissions Reduction Program of the Affordable Care Act (ACA). This program requires that the Centers for Medicare & Medicaid Services reduce Medicare fee-for-service hospital readmission rates for conditions that account for frequent readmissions

(CMS 2012). However, research suggests that readmission studies that are focused on vulnerable populations should include longer follow-up timeframes to account for community-based factors, such as access to primary care settings for a follow-up visit, the ability to access needed prescribed medications, and patient self-management of disease indicators, which each impact the risk of hospital readmissions (Jiang et al. 2005). The current study addressed this by examining hospital readmission rates at 30 days, 90 days, and 12 months. Results at each time point in the current investigation provide additional evidence that longer follow-up periods may provide researchers with a better understanding of the rate of hospital readmissions over time. Lastly, despite the small sample size, we found a difference in the rate of hospitalization among the study participants who received the peer support intervention compared to those who did not, which suggests that this line of inquiry deserves further research and investigation.

## 8. Conclusions

The penalties imposed by the ACA's Hospital Readmission Reduction Program for excessive readmissions is prompting hospitals to reform their policies around patient discharges and continuing care. This study provides preliminary evidence that peer support can have a significant impact on patient outcomes, reducing the risk of hospital readmission and reducing mental health symptoms. Healthcare workers, including hospital social workers, nurses, case-managers etc., may be called to make decisions about post-discharge interventions for patients' self-care and to prevent subsequent readmissions (Conlisk and Casiano 2016). Our results suggest that healthcare workers should focus on ensuring that older adults who are living with medical and mental health co-morbidities have adequate support post-discharge and that they should refer patients to programs with peer support components. Further, healthcare workers who manage community-based health programs should consider strategies for implementing peer support programs. It is increasingly recognized that lay providers can in fact improve health outcomes and this investigation offers some initial data to suggest that the role of peer education can make a difference in reducing potentially preventable hospital readmissions among vulnerable populations of older adults living with co-morbid medical and mental health conditions.

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