Housing as an Intervention on Hospital Use: Access among Chronically Homeless Persons with Disabilities

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ABSTRACT *A study examining demographics and hospital utilization for chronically homeless persons with disabilities was conducted at pre-housing enrollment and at 6 months post-housing. Of the 20 participants, 70% (n=14) were Black American and 30% (n=6) were White; 100% (n=20) were non-Hispanic; 90% (n=18) were men; 40% (n=8) were veterans; Median years since last permanent housing and total homelessness were 7 and 10.5 respectively. The following increases were observed: employment (0 to 1); income (20%, n=4 to 35%, n=7); primary care (25%, n=5 to 95%, n=19); and mental health service use (25%, n=5 to 60%, n=12). Known disabilities included HIV (15%, n=3); hepatitis C (45%, n=9); mental illness (60%, n=12) and substance abuse (80%, n=16) with 45% (n=9) dually diagnosed. Over the course of the study, Emergency department visits and inpatient hospitalization use decreased. While these differences were not statistically significant ($p=0.14$ and $p=0.31$, respectively), they translate to an estimated \$250,208 savings.*

KEYWORDS *Disability, Housing first, Chronic homeless*

Poor health outcomes among persons who are homeless are well documented.¹⁻³ In addition to poor health, persons who are homeless have more emergency department visits and inpatient hospital stays compared to persons who are housing secure.^{4,5} Persons who are chronically homeless and disabled are at greater risk of negative health consequences due to increased prevalence of mental health issues, substance abuse disorders, and a greater level of disconnection from preventative medical care.⁶

Among the homeless is a subset of persons who are defined as chronically homeless. The United States Department of Housing and Urban Development (HUD) defines chronic homelessness as an unaccompanied adult who has been homeless one year or more or who has experienced four occurrences of homelessness in the last three years. Additionally, homeless persons suffering from long-term disabilities are more likely to be unemployed or underemployed, thus limiting available housing options due to lower income.

The impact of increased prevalence rates of mental illness, substance abuse, and disabling health conditions are exacerbated by the current standard of housing in the United States which can be defined as “housing ready.” “Housing ready” requirements

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are often unattainable and unsustainable, especially among the chronically homeless. Such requirements often include that the homeless person accept services such as case management, mandatory sobriety with zero tolerance for substance use, mandatory or strongly encouraged medication for those with mental illness, and medical stability. While it is understandable that many of these requirements might improve the health of persons who are homeless, they create a class of homeless individuals who cannot achieve those standards without a direct intervention.⁶

One of the most effective interventions for the chronically homeless is the Housing First methodology. The Housing First methodology is a reversal of common practice in the United States by providing more immediate housing prior to supportive services. Housing First is based on the principle that long-term housing creates the stability needed in order to pursue other beneficial goals such as mental health care, medical care, case management, or employment. Once homeless persons are stabilized in housing, optional services are offered through active engagement and outreach. Through housing stabilization and the availability of services, many clients of Housing First programs are more successful when measured on outcomes of physical and mental health, substance abuse, health care utilization, and access to mainstream services including social security benefits and Medicare/Medicaid enrollment.⁸ When assessed on its overall impact, Housing First has the potential to be one of the most effective programs to address chronic homelessness by reducing overall cost to the community; successfully transitioning homelessness into stable housing; improving health outcomes; and increasing acceptance of medical care as well as mental health and substance abuse treatment services.

There are many models and methods for addressing homelessness that are commonly used in the United States. Most models are based on the premise in order to be eligible for housing, an individual should be medically stable, active in treatment for mental health issues, drug free, and have stable income. While housing-ready approaches may be effective for persons experiencing homelessness for the first time, for those with stable connection to care and services, and for those without disabilities, these models may not be as effective in addressing homelessness among chronically homeless persons. Outcomes from programs using the Housing First methodology should be tailored to meet the service needs of the target population as well as evaluated for effectiveness regarding cost, access to health care, and health outcomes.

SPECIFIC AIMS

The focus of this project is to provide a sociodemographic profile of the homeless population, pre- and post-housing differences, and observed differences in the utilization of hospital care (emergency department and inpatient hospitalization) among disabled, chronically homeless persons in Columbia, South Carolina.

METHODS

This project was determined exempt by the University of South Carolina Institutional Review Board (Pro#00005318) as it was a secondary data analysis of extant program records and included inpatient and outpatient records available to program staff. Participant data were collected on persons enrolled and housed through a Housing First program operated by the School of Medicine in Columbia, South Carolina who met the

following inclusion criteria: a signed HIPAA notice of privacy practices on file, a signed release authorization for health care records, and housing through the Housing First program for no less than six months.

Procedure

From a total sample size of 20, data were abstracted from internal charts and recorded on a de-identified data recording form using a unique record number (URN). The URN allowed for a linkage with a hospital service utilization form of de-identified data. This seven-character URN was an alphanumeric code which followed the method outlined by the National Institutes of Health HIPAA Privacy Rule Information for Researchers.

Hospitalization data included both inpatient and emergency department visits for the following time periods: from 12 months prior to housing to date housed, from six months prior to housing to date housed, and from date housed to six months post-housing date. The entire date range included 18 months. Records from two area hospitals and the Veteran's Administration Medical Center were reviewed due to the fact that these facilities historically provide the vast majority of hospital services in this population. One record in the Veteran's Administration Medical Center could not be reviewed as it was restricted. Study staff entered data into Microsoft Excel for data storage. Post-entry data were reviewed and checked by two additional staff members to decrease potential for errors during data entry. Data were analyzed using STATA 10 statistical software (College Station, Texas).

Cohort Description

Participants were recruited from a Housing First program operated by the University of South Carolina School of Medicine. Entry requirements for this program include: chronic homelessness as defined by HUD, no other option for housing, and a disability of a long-term duration. There is no income requirement for this program. This program offers supportive services including mental health, substance abuse treatment, employment services, medical care, and case management. The only requirement for participation is a monthly meeting with a case manager. Clients are recruited through outreach and are referred to the Housing First team for assessment. Time from assessment to housing averages 30 days.

Basic demographics of the sample are reported in Table 1. The overall sample was comprised primarily of men (90%, $n=18$), Black American (70%, $n=14$), and non-Hispanics (100%, $n=20$), with 40% ($n=8$) of the sample reporting US military veteran status. Overall, the median time since last permanent housing was seven years (range 2–22) with a 10.5-year median (range 2–22) of total homelessness.

Disabilities reported at program entry were dominated by diagnoses of substance abuse disorders (80%, $n=16$), mental illness (60%, $n=12$), including nine persons with both conditions (45%, $n=9$). Confirmed concurrent infectious diseases diagnoses included chronic hepatitis C virus infection (45%, $n=9$), human immunodeficiency virus infection (15%, $n=4$), and hepatitis B virus infection (5%, $n=1$). The total number of major diagnoses at entry was 128 with an individual mean (6.4), median (5.0), and range (2–15) of major diagnoses per person. There were a total of 90 prescribed medications reported by participants upon program entry, with an individual mean (4.5), median (3.5) and a per person range (0–18).

TABLE 1 Demographics and self-reported homelessness of the study sample (n = 20)

Age	Mean	53.6	Median	54.0	Range	36.0–78.0
Sex	Men	18 (90%)	Women	2 (10%)		
Veteran	Yes	8 (40%)	No	12 (60%)		
Race	Black American	14 (70%)	White American	6 (30%)		
Ethnicity	Non-Hispanic	20 (100%)				
Years since last permanent housing	Mean	8.45	Median	7.0	Range	2.0–22.0
Total years homeless	Mean	11.1	Median	10.5	Range	2.0–29.0
Number of major diagnoses	Mean	6.4	Median	5	Range	2–15
HIV infected	3 (15%)					
HCV Infected	9 (45%)					
Co-infected (HIV + HCV)	1 (5%)					
Mental illness diagnosis at entry	12 (60%)					
Substance abuse disorder diagnosis at entry	16 (80%)					
Co-occurring mental health and substance abuse	9 (45%)					

RESULTS

Post-6 Months Housing

Comparisons of multiple factors at intake and at the six months post-housing stages are detailed in Table 2. Due to the small sample size and questions about the normalcy of the underlying distribution, Wilcoxon matched-pairs signed-rank tests were conducted to compare medians in the pre- and post-housing status. The findings were as follows: employment at intake within the sample increased from zero to one participant ($p=0.32$), use of a primary care physician increased from five to 19 ($p=0.01$), income increased from four to seven ($p=.08$), health care benefits increased from three to six ($p=0.08$), mental health services increased from five to 12 ($p=0.01$), substance abuse treatment increased from zero to one participant ($p=0.32$), approval for Medicaid or Medicare increased from two to five ($p=0.08$), social security benefits increased from one to six ($p=0.03$), receipt of food stamps increased from 13 to 20 ($p=0.01$), and qualification for special needs bus pass increased from zero to 15 ($p=0.01$). The number of prescribed medications also increased from a median of 3.5 to 4.0 ($p=0.04$) and the number of prescribed medications on hand increased from 2.0 to 3.0 ($p=0.20$).

Outcomes of hospital use included inpatient and emergency department use six months before housing and six months after housing. The findings are outlined in Table 3. One participant was excluded from hospitalization use analyses due to critical illness and death. This is because inclusion of these data would introduce bias into the analyses of standard use of hospital services among the disabled, chronically homeless. Evaluation of 12-month emergency department use pre-housing found a total of 163 visits ($\bar{x} = 8.58$, median=3, range 0–34). For the 6 months pre-housing, there were 91 visits with a $\bar{x} = 4.79$, median=2 and a range of 0–23 compared to 41 visits six months post-housing ($\bar{x} = 2.16$, median=1, range 0–24). A t test for matched-pairs did not yield a statistically significant difference in

TABLE 2 Comparison of multiple factors at service intake and after 6 months of housing ($n=20$)

	Pre-housing	6 Months post-housing	Non-parametric univariate analyses
Employment	0 (0%)	1 (5%)	Prob> z =0.32
Primary care physician ^a	5 (25%)	19 (95%)	Prob> z =0.01
Income	4 (20%)	7 (35%)	Prob> z =0.08
Health care benefits	3 (15%)	6 (30%)	Prob> z =0.08
Mental health services ^a	5 (25%)	12 (60%)	Prob> z =0.01
Substance abuse treatment	1 (5%)	0 (0%)	Prob> z =0.32
Medicaid/Medicare	2 (10%)	5 (25%)	Prob> z =0.08
Social security benefits ^a	1 (5%)	6 (30%)	Prob> z =0.03
Food stamps ^a	13 (65%)	20 (100%)	Prob> z =0.01
Special needs bus pass ^a	0 (0%)	15 (75%)	Prob> z =0.01
Median number of prescribed medications ^a	3.5	4.0	Prob> z =0.04
Median number of on hand prescribed medications	2.0	3.0	Prob> z =0.20

Frequencies are reported with percentage of total in each cell. Wilcoxon signed-rank tests were used for univariate analyses allowing median comparison

^aA statistically significant difference in the pre- and post-housing median

TABLE 3 Comparison of hospital use, inpatient and emergency department at service intake and after 6 months of housing (*n*=19)

	12 Months pre-housing	6 Months post-housing	Univariate analyses
12-Month emergency department use	163 visits 8.58 mean 3.0 median Range (0–34)		
6-Month emergency department use	91 visits 4.79 mean 2.0 median Range (0–23)	41 visits 2.16 mean 1.0 median Range (0–24)	$t, df(18)=1.55$ $Pr(T > t)=0.14$
6-Month inpatient hospitalization admission frequency	12.0 total admissions 0.63 mean Range (0–3)	7.0 total admission 0.37 mean Range (0–4)	$t, df(18)=1.05$ $Pr(T > t)=0.31$
6-Month inpatient hospitalization days	63 total days 3.32 mean Range (0–17)	57 total days 3.00 mean Range (0–34)	$t, df(18)=0.14$ $Pr(T > t)=0.90$

mean comparisons $t(18)=1.55, p=0.14$. Inpatient admissions declined from 12 to seven after housing $t(18)=1.05, p=0.31$ and total number of inpatient days among participants declined from 63 to 59 $t(18)=0.14, p=0.90$.

DISCUSSION

As evidenced by trends in multiple markers of improved health, housing appears to be an effective intervention regarding access to a primary care physician and mental health services, as well as receiving social security benefits, food stamps, and transportation assistance. By increasing the use of medical and mental health care as well as reducing transportation costs for those with stable housing, improvements in overall health should continue.

As an evaluation of a Housing First program, is important to note that although this study deals with a small sample size, it is representative of the documented chronically homeless population in Columbia, South Carolina. Specifically, data from the 2009 HUD Homeless Count in Columbia show that 17% of the homeless in the study area are chronically homeless, 16% have chronic substance abuse problems, 11% have mental illness, and 28% have a disability. However, there are methodological issues with the homeless count data due to the fact that counts are conducted largely by untrained volunteers with methods that are more practically oriented than scientifically controlled.

If persons among the chronically homeless population were expected to become “housing ready” prior to placement, it is possible this study would have yielded different results as many of the chronically homeless population may not be able to meet such requirements. When comparing Housing First to other permanent supportive housing programs, data have shown that persons in Housing First programs are less likely to use substances over time, have greater residential stability, and have lower associated costs.^{8,9}

Housing status also appears to have a positive impact on decreasing medical service usage in both inpatient and outpatient settings. While the results of this study did not yield statistically significant differences in this area, the financial implications of our findings are important. Financial data on hospitalizations both inpatient and emergency department visits were queried from the South Carolina Budget and Control Board, Office of Research and Statistics website. In 2008, the average cost of inpatient hospitalization for Richland County, SC was found to be \$5,618 per day.¹⁰ These averages are calculated by analyzing state wide data in order to provide a stable and representative “average” for a population. The documented six-day inpatient stay reduction therefore resulted in an estimated cost savings of \$33,708. Furthermore, one of the study's participants was diagnosed with cancer and remained in the hospital for a total of 34 days. This lengthy hospitalization could have been shortened had the participant received earlier treatment through proper access to medical care. While this finding influenced the data on hospital stays, this case was retained in the analyses. The number of hospital inpatient admissions also decreased from 12 to seven in the same six month period. In 2008, an emergency department visit in Richland County, South Carolina costs an average of \$4,330. By reducing the total number of emergency department visits reduced by 50, this yields an estimated savings of \$216,500 over the 6-month period.

Other authors have reported statistically significant outcome improvements using an intensive case management or Housing First intervention.^{4,9,11} Significant reductions in hospital usage were found in each study, where housing was provided for both acute and chronic health conditions. While a comprehensive cost savings analysis of this housing intervention is potentially feasible and could yield a higher estimate of the economic efficacy of Housing First, it is beyond the scope of this paper. When only inpatient and emergency department use were considered, the estimated cost savings during the initial six-month period was \$250,208. While this is likely an underestimate of the true cost savings, \$250,000 would cover the cost of housing for all 19 participants for approximately 18 months using the Housing and Urban Development estimates of housing at \$688/month for Columbia, SC.

These findings indicate that Housing First is not only cost-effective but likely cost-saving. Housing First models should therefore be considered by hospitals in order to decrease readmission rates as well as decrease the number of unreimbursed emergency room visits. This would include Veteran's Administration Medical Centers that have an incentive to reduce the impact that chronically homeless persons have on their services. In this sample, 40% of homeless were veterans. The data presented should also be considered by agencies that seek funding from the HUD as well as the US Veterans Administration due to their focus on chronic homelessness as well as city governments. This is because city governments are disproportionately impacted by chronically homeless persons when compared to more rural areas.

Opportunities for future research in this area include using a larger sample size and a longer follow-up in order to help reduce bias and improve the external validity of the findings. A randomized study of the chronically homeless population comparing a Housing First approach with a Permanent Supportive Housing model would also allow for a better determination of the Housing First program's efficacy.

Additional follow-up analysis on this sample will be conducted when the participants have completed 12 months in housing. For this analysis, we will propose to use a control group of chronically homeless persons without housing for comparison with the study sample. Comparisons will be made on the health and

service outcomes between the groups. This more comprehensive client level cost analysis could produce even more robust estimates of cost savings.

In summary, housing using a Housing First approach appears to be an effective, cost-effective, and potentially cost-saving health intervention for the chronically homeless. Funding agencies should consider Housing First approaches as part of the continuum of care of this difficult-to-reach subset of the homeless population.

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