

Effects of Housing First on Employment and Income of Homeless Individuals: Results of a Randomized Trial

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Objective: Housing First is emerging as an evidence-based practice for housing and supporting people who are homeless and have a mental illness. The objective of this study was to determine whether Housing First increases the odds of obtaining competitive employment in this population and affects income, including income from informal and illegal sources.

Methods: A total of 2,148 people with a mental illness were recruited from five Canadian cities while they were homeless, classified as having moderate or high needs, and randomly assigned to Housing First or usual care. Housing First participants with high needs received assertive community treatment (ACT), and those with moderate needs received intensive case management (ICM). Every three months, participants were interviewed about employment and earnings in the previous months (median follow-up=745 days). Regression models were estimated via generalized estimating equations.

Results: ICM recipients had lower odds of obtaining employment compared with the control group with moderate needs. The odds of obtaining employment among ICM recipients increased but their employment rate never exceeded that of the control group. For ACT recipients, the odds of obtaining employment were not significantly different from those of the control group. Among Housing First participants, persons employed at baseline, men, and younger participants had greater odds of employment compared with control participants. Housing First did not appear to significantly increase income.

Conclusions: This was the first large-scale randomized controlled study of Housing First's effects on employment. Further research is needed to determine how Housing First may be enhanced to increase odds of obtaining employment.

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Housing First with scattered-site housing, as defined by Pathways to Housing (1) in New York, is emerging as an evidence-based practice for people who are homeless and have a mental illness (2–4). It increases housing stability and can improve community functioning and quality of life (5,6). Its effects on employment, however, are unclear. Housing First per se combines access to subsidized housing with the support of an assertive community treatment (ACT) or intensive case management (ICM) team. Evidence indicates that ACT and ICM services alone generally do not increase employment rates (7,8): they need to be combined with supported-employment services to be effective (9).

Homelessness, however, presents unique barriers to employment, such as exposure to conditions that exacerbate substance use, problems securing psychiatric care, and shelter policies that restrict an individual's ability to work odd hours (10,11). It is reasonable, then, to hypothesize that ACT and ICM services, especially more modern, recovery-oriented variants (12), which seek to help clients attain their own goals, might be more effective after people transition

from homelessness into housing. On the other hand, programs that provide stable housing with the support of an ACT or ICM team may increase people's access to incomes via rent subsidies and government support (13), thereby reducing the financial incentives to work.

Studies of ACT and ICM programs for people who are homeless, regardless of whether the program offers access to subsidized housing, have not examined employment outcomes or earnings (3). However, previous research suggests that when paired with employment services, supported housing can have a positive impact on the employment of people who have a mental illness and have been homeless (14). It is not clear how Housing First affects employment in the absence of an adjunctive supported-employment intervention.

The At Home/Chez Soi trial tested the effectiveness of scattered-site Housing First in five Canadian cities: Moncton, Montreal, Toronto, Winnipeg, and Vancouver. The intervention effectively increased housing stability for participants (15–17). The objective of this study was to determine

whether Housing First also increased the odds of obtaining competitive employment. Findings will help determine whether adjunctive employment interventions are needed to help Housing First service users find work. In addition, we hypothesized that Housing First participants would receive more social assistance and disability benefits and would therefore rely less on informal sources of income, such as panhandling, selling drugs, or prostitution.

METHODS

Setting and Participants

All participants recruited for the At Home/Chez Soi project (17) were included in this study. The study protocol, inclusion criteria, and descriptions of interventions were published elsewhere (18). Participants were classified as having high needs or moderate needs and then were randomly assigned to Housing First or a control group. Inclusion criteria were age 18 years or older, the presence of mental illness, and the experience of absolute homelessness or of being precariously housed and having had at least two instances of absolute homelessness in the past year. Recruitment extended from October 2009 to June 2011. Data collection ended in June 2013.

Ethics approval was obtained from the local ethics review board at each data collection site and from the university-affiliated teaching hospital where the coordination center was based. Written informed consent was obtained from all participants.

Intervention

The Housing First approach aims to facilitate reintegration and recovery by offering people a choice of scattered-site, subsidized housing (1). Specialized multidisciplinary mobile teams support people in their communities. Participants received rent subsidies of up to \$600 per month, enough to ensure that they spent less than 30% of their income on rent (18). Participants with high needs received Housing First services from ACT teams (1,15), whereas persons with moderate needs received services from ICM teams (16). Neither the ACT team nor the ICM team systematically included supported-employment services. These interventions were implemented with good fidelity to the Pathways to Housing scattered-site Housing First model (19). They significantly improved housing stability, quality of life, and community functioning for ACT and ICM groups (15–17).

Participants assigned to the control group could access any intervention programs available in their communities. Their only contact with the project was during quarterly interviews (18).

Measures

Interviewers collected demographic data, health service use history, criminal justice system involvement, and history of homelessness at baseline. Community functioning was assessed at baseline with the Multnomah Community Ability

Scale (MCAS) (20,21). Scores of 48 to 62 represent a medium level of disability, and higher scores indicate less disability. Interviewers, with support from clinicians, used the Mini-International Neuropsychiatric Interview (22) and clinical chart review to determine psychiatric diagnosis and alcohol and substance use disorders at baseline.

Interviews conducted at three-month intervals retrospectively documented participants' self-reported housing (the primary outcome of the overall study), employment, and earnings. Employment outcomes included start and end dates of jobs, type of jobs (competitive or sheltered and regular or casual), hours worked, and wages. Competitive jobs were defined as work other than jobs reserved for people with disabilities that paid at least minimum wage. Self-reported income was grouped into four categories: government support (welfare, public pension, and disability income), employment income (regular or casual), earnings from street activities (panhandling, collecting recycling, and using squeegees to wash windshields), and income from illegal activities (sex and drug trades and theft). Interviews were scheduled to end 24 months after randomization, but budgetary restrictions shortened the study period. For participants recruited during the latter half of the study, interviews ended at 21 months. The median follow-up was 745 days.

Statistical Analysis

Participants were analyzed in the groups to which they were assigned, in an intention-to-treat design. Regression models, stratified by need level and estimated by using generalized estimating equations (GEEs), were used to determine the effect of Housing First on income sources and the odds of obtaining competitive employment. These population-average models yielded comparisons between individuals rather than within individuals (23). GEEs with logit link function models were used to determine the effect of Housing First on the odds of obtaining competitive employment by month. Separate regressions were used to model each type of income as a continuous variable, depending on the distribution of the data (Gaussian distribution with an identity link function for normally distributed variables, such as government support income, and gamma distribution with log link function for skewed distributions, such as income from employment). The average marginal effects over all covariates were then derived from the model predictions to determine mean differences in income between Housing First and control groups. An autoregressive correlation structure was appropriate for all models. Robust standard errors were used to account for the use of repeated measures. An alpha of .01 was used to indicate significance, and no adjustment for multiple testing was applied (24).

The regression models predicted either income or the odds of obtaining competitive employment retrospectively at 30-day intervals. Analyses included only jobs obtained after the date of the participant's random assignment to Housing First or the control group. Predictors included

random assignment to Housing First or the control group, time (a continuous variable), treatment \times time interaction, site, community functioning at baseline (MCAS score), and age. Several dichotomous variables were included (gender, competitive employment at baseline, and 12 or more years of education). MINI-derived variables included the presence of a psychotic disorder, an alcohol use disorder, and a substance use disorder. To account for the possibility of better recall of recent jobs, a variable indicating whether participants were more likely to report being employed during the 30-day window prior to the interview was included. Participants with fewer than nine months of data were dropped from the final regression analyses. Sensitivity analyses were conducted to determine whether the results were driven by participants who were employed at baseline.

Negative binomial regression models, including the same covariates as in the GEE models described above, were used to compare number of hours worked per week, an over-dispersive count variable, by the Housing First and control groups. Hourly wage and duration of job tenure were compared with *t* tests. For comparisons in which distributions were skewed, as determined by the Shapiro-Wilkes test for normality, the Kruskal-Wallis equality-of-populations rank test was used. The median and interquartile range (IQR) are reported if data were skewed. The Pearson chi square test was used for categorical variables. Fisher's chi square was used if there were fewer than five observations in any given cell.

Multiple imputation models, calculated by chained equations with predictive mean matching (25), were used to handle missing outcome data (6% of employment data and 9% of income data). A month was considered missing if any period of 30 days included two or more missing days and did not include any days of employment. The imputed values were a function of employment and housing stability during the two months before and after the month with missing data. The models were set to impute 50 data sets by using chained iterations cycling over 2,000 iterations, considered sufficient to guard against reduced power (26). Analyses were completed in Stata, version 13 (27).

RESULTS

Individuals ($N=2,866$) were assessed for eligibility, and 611 were excluded for various reasons. A total of 2,255 individuals were assigned to Housing First or a control group, but 107 participants in Housing First were part of a substudy at a congregate site in Vancouver that tested a different type of Housing First intervention and, therefore, were not included in these analyses, leaving 2,148 participants. Participants excluded due to insufficient data did not differ significantly from those retained, with the exception of employment at baseline. Of the 61 participants who reported employment at baseline, 11 were excluded (18%) because of insufficient data, compared with 178 of the 2,087 (8%) participants who did not report employment at baseline ($p=.01$). Thus, participants employed at baseline were more likely to leave

the study early. Participants' demographic characteristics, psychiatric diagnoses, and history of homelessness are presented in Table 1. [A CONSORT flow diagram is available as an online supplement to this article.]

The results of the analyses of the effect of Housing First on the odds of obtaining competitive employment, before and after adjustment for covariates, are presented in Table 2. [The adjusted log odds of obtaining competitive employment are plotted in Figures 2 and 3 in the online supplement illustrating the treatment \times time interaction. The supplement also contains Figures 4 and 5 illustrating the percentage of participants in competitive employment over time.]

Compared with a control group with a moderate level of needs, ICM participants had lower odds of obtaining employment (Table 2). Over time, both ICM and ACT recipients had better odds of obtaining employment compared with the control groups, but the rate of increase was significant only for ICM participants, as indicated by the treatment \times time interaction. In both the ICM and ACT groups, men, younger participants, and participants employed at baseline had increased odds of obtaining competitive employment compared with the control groups. Recipients of ICM with more than 12 years of education and with higher MCAS scores had greater odds of obtaining competitive employment compared with the control group. Participants recalled more jobs that began in the 30-day period prior to the interview compared with jobs occurring more than 30 days prior to the interview. This effect was large in magnitude and highly significant in both groups.

The sensitivity analyses that excluded participants employed at baseline found qualitatively identical results: the Housing First group had lower odds of employment compared with the control group. Other covariates did not differ in direction or significance of their association. [The odds of employment among participants who did not report employment at baseline are provided in Table 1 of the online supplement.]

Secondary employment outcomes are presented in Table 3. None of the differences between the Housing First and control groups was statistically significant. [Results of full regression models comparing the hours worked in competitive employment by the Housing First and control groups are provided in Table 2 of the supplement.]

Tables 4 and 5 report earnings for the ACT and ICM groups, respectively, compared with those for the control groups. The estimated marginal effect (the tables' last three columns) indicates that there were no statistically significant differences between the Housing First and control groups in monthly income from various sources over time [see Tables 3–6 in the online supplement for GEE results for all income sources].

DISCUSSION

In this large trial, participants receiving Housing First had lower odds of obtaining competitive employment compared

TABLE 1. Characteristics of participants in Housing First and a control group, by level of needs^a

Characteristic	High needs				Moderate needs			
	Housing First (ACT) (N=469)		Control (N=481)		Housing First (ICM) (N=689)		Control (N=509)	
	N	%	N	%	N	%	N	%
Length of follow-up (M±SD days)	684±169		642±204		684±157		640±202	
Male	320	68	329	68	448	65	344	68
Age (M±SD)	38.9±10.8		39.9±11.2		42.2±11.1		42.1±11.3	
>12 years of education	176	38	180	37	283	41	234	46
MCAS score (M±SD) ^b	54.6±7.3		54.4±7.2		64.7±6.2		64.7±6.2	
Worked continuously for at least 1 year	283	60	303	63	473	69	356	70
Competitively employed at baseline	9	2	12	2	13	2	15	3
Reason for not working								
Mental illness	216	46	229	48	283	41	194	38
General medical illness	52	11	48	10	95	14	81	16
Both	73	16	64	13	84	12	70	14
Other ^c	128	27	140	29	227	33	164	32
No arrests in past 6 months	268	57	278	58	489	71	355	70
Would like paid employment	347	74	344	72	518	75	387	76
Diagnosis								
Psychotic disorder	285	61	302	63	188	27	142	28
Major depressive disorder	79	17	94	20	336	49	228	45
Mania or hypomania	71	15	60	13	84	12	74	15
Mood disorder with psychotic features	24	5	16	3	28	4	26	5
PTSD	1	<1	5	<1	26	4	23	5
Panic disorder	5	<1	2	<1	23	3	13	3
Undetermined	4	<1	2	<1	4	<1	3	<1
Alcohol use disorder at baseline	213	45	223	46	296	43	224	44
Substance use disorder at baseline	286	61	280	58	321	47	242	48
Percentage of adult life spent homeless								
<1.0	17	4	24	5	55	8	36	7
1.0–2.9	45	9	42	9	97	14	71	14
3.0–7.9	70	15	77	16	120	17	81	16
8.0–19.9	106	23	125	26	138	20	122	24
20.0–39.9	89	19	18	4	145	21	92	18
>40.0	141	30	125	26	138	20	107	21

^a Housing First recipients with high needs received assertive community treatment (ACT), and those with moderate needs received intensive case management (ICM).

^b MCAS, Multnomah Community Ability Scale. Scores of 48 to 62 represent a medium level of disability, and higher scores indicate less disability.

^c Other reasons included substance use, criminal records, homelessness, educational limitations, and lack of employment opportunities.

with a control group with similar levels of need. Employment rates rose over time for participants with high needs and moderate needs in both the Housing First and control groups. The treatment × time interaction suggests that Housing First led to increasing odds of obtaining competitive employment among ICM participants compared with the control group; this increase over time was statistically significant. However their rates of employment did not surpass those of the control group [see online supplement for a figure plotting employment percentage over time]. In terms of income, Housing First appeared to have no significant effect.

The finding that Housing First participants had lower odds of obtaining competitive employment compared with the control groups was unexpected. Admittedly, Housing First, as an intervention that consists of several clinical and

nonclinical services designed to help people retain stable housing, does not typically include specialized employment support services (28), but it is expected to work toward client goals. Qualitative findings suggest that homelessness creates barriers to obtaining employment (10,11), so it would have been reasonable to expect an intervention that provides stable housing to help overcome these barriers. Rent subsidies, as well as increased income from government benefits, may have reduced the financial burden of unemployment, allowing Housing First participants to focus on other issues and reducing their incentive to work.

In addition, Canadian provinces have varying rules governing how employment earnings affect disability benefits [see Table 7 in the online supplement for details about earning exemption allowances by province]. The odds of obtaining competitive employment for people with high needs were greater in Moncton and Vancouver, the provinces with greater earning exemptions for people receiving disability benefits. These results suggest that greater allowances may

encourage more people with disabilities to work. However, research specifically addressing this issue is necessary to confirm this hypothesis. Among ICM participants, however, whose functional level was higher, Housing First appeared to have progressively compensated for this initial effect of disincentivizing work. It may be that with a longer follow-up period, employment rates in the ICM group would have eventually surpassed those of the control group. It remains to be seen whether augmenting Housing First with evidence-based supported employment could be helpful in regard to obtaining employment.

The finding that Housing First did not increase income from government supports is also surprising given past literature suggesting that having a fixed address facilitates receiving benefits checks (13). This suggests that participants

likely continued to live below the poverty line, as they did while they were homeless (29).

The low rates of employment observed in our study were slightly below previous estimates of employment rates in populations with mental illness—between 8% and 30% (30,31). They contrasted markedly, however, with the percentage (74%) of participants who, at baseline, expressed a desire to return to employment. Specialized services, such as evidence-based supported employment, may be needed to help people with mental illness and a recent history of homelessness to achieve their goals of employment (14).

Finally, it may be that our intent-to-treat analysis obscured a causal mechanism whereby Housing First leads to stable housing, which, in turn, leads to increased odds of employment. To control for stable housing in a regression model intended to test the effects of Housing First would be akin to controlling for an intermediate outcome along the causal path between Housing First and employment. Future research relying on more complex methods, such as structured equation modeling, could explore the complex relationship between Housing First, stable housing, and employment.

This study had several strengths. First, this was the first study to use a randomized controlled design to test the effect of Housing First on employment outcomes of people who are homeless and have a mental illness. Second, using a large sample derived from several sites increased the external validity of the findings. Third, researchers conducting the recruitment searched for participants from various sources, increasing the sample's representativity. Finally, good rates of follow-up were achieved (17,32).

However, several limitations may be noted. The study grouped data from five research teams working in different cities. In spite of efforts to standardize data collection procedures, there may have been slight differences across sites. To deal with this limitation,

TABLE 2. Variables associated with the odds of obtaining competitive employment among Housing First recipients versus a control group, by level of needs

Variable	High needs (N=856) ^a			Moderate needs (N=1,103) ^a		
	OR	95% CI	p	OR	95% CI	p
Housing First (unadjusted)	.68	.50–.94	.019	.73	.54–.98	.033
Housing First (adjusted)	.52	.28–.97	.041	.38	.22–.65	.001
Time	1.05	1.02–1.07	<.001	1.02	.99–1.04	.125
Housing First × time interaction	1.02	.98–1.06	.353	1.05	1.01–1.08	.009
Site (reference: Montreal)						
Vancouver	2.48	1.44–4.28	.001	.72	.48–1.09	.126
Winnipeg	.77	.38–1.57	.469	.56	.37–.85	.006
Toronto	.65	.34–1.24	.190	.40	.28–.59	<.001
Moncton ^b	2.79	1.58–4.92	<.001			
Male (reference: female)	1.63	1.13–2.37	.010	1.53	1.11–2.10	.009
>12 years of education (reference: <12 years)	1.29	.95–1.74	.105	1.49	1.12–1.99	.007
Age	.96	.95–.98	<.001	.97	.96–.99	<.001
Employed at baseline (reference: not employed at baseline)	8.81	6.01–12.90	<.001	13.49	9.24–19.69	<.001
Psychotic disorder at baseline (reference: no psychotic disorder at baseline)	.71	.49–1.03	.071	.78	.57–1.08	.136
Alcohol disorder at baseline (reference: no alcohol use disorder at baseline)	1.48	1.08–2.04	.014	1.18	.86–1.62	.304
Substance use disorder at baseline (reference: no substance use disorder at baseline)	.64	.47–.89	.008	.79	.57–1.11	.174
MCAS score ^c	1.00	.98–1.02	.931	1.03	1.01–1.06	.009
Data for month in which the interview took place (reference: data for 2 previous months)	1.70	1.58–1.82	<.001	1.67	1.56–1.79	<.001

^a A consort diagram in the online supplement describes the sample size and attrition.

^b No participant at the Moncton site was classified as having moderate needs.

^c MCAS, Multnomah Community Ability Scale

income categories were first separated into smaller components and then recombined into general categories in a way that was standard across all sites.

Employment and income data were self-reported. Few people reported income from illegal activities, preventing the

TABLE 3. Secondary employment outcomes related to competitive employment among Housing First recipients and a control group^a

Outcome and level of needs	Housing First		Control group		Test statistic	df	p
	Median	IQR ^b	Median	IQR ^b			
Job tenure, in days							
High needs	85	38–197	119	60–258	t=-1.13	331	.256
Moderate needs	83	36–203	94	41–170	t=-.87	417	.381
	M	SD	M	SD			
Hours per week							
High needs	22.8	14.9	27.1	20.7	β=1.33		.482
Moderate needs	23.0	16.4	26.5	15.5	β=-2.19		.092
Hourly wage							
High needs	12.30	3.89	13.20	7.12	t=-1.43	359	.131
Moderate needs	13.20	6.39	13.66	7.01	t=-.76	449	.446

^a The full negative binomial regression models included site, age, sex, education, psychotic illness, alcohol use disorder at baseline, substance use disorder at baseline, and Multnomah Community Ability Scale score at baseline as covariates.

^b IQR, interquartile range

TABLE 4. Sources of monthly income reported by Housing First participants and members of a control group with high needs for services^a

Income source	Housing First						Control						Regression model (N=856) ^b		
	First month (N=469)		Last month (N=439)		Income during last month, in Canadian \$ ^c		First month (N=481)		Last month (N=417)		Income during last month, in Canadian \$ ^c		Marginal mean ^c	95% CI	p
	N	%	N	%	Median	IQR	N	%	N	%	Median	IQR			
Total	409	87	423	96	881	590–975	393	82	388	93	890	594–986	34.24	–10.24 to 78.71	.131
Government support	398	84	414	94	870	540–930	374	78	373	89	875	577–910	13.97	–18.17 to 46.10	.394
Competitive employment	9	2	22	5	200	112–960	12	2	21	5	300	200–1,259	–8.68	–13.76 to 3.60	.061
Street activities	61	13	44	10	120	60–400	58	12	36	9	140	50–500	–.84	–25.55 to 23.87	.947
Illegal activities ^d	15	3	10	2	1,000	500–1,984	17	4	13	3	600	200–1,550			

^a The first month refers to the first month for which data were reported, and the last month refers to the last month for which data were reported, for a median follow-up of 745 days.

^b The full regression models included age, sex, education, psychotic illness, alcohol use disorder at baseline, and site as covariates. The marginal mean is the difference in monthly income between the Housing First and control groups, in Canadian dollars.

^c Only for participants reporting that income source. IQR, interquartile range

^d Convergence of regression model not achieved because of zero-inflated data

use of longitudinal analyses. Also, the reporting of employment was subject to a recency effect. This effect should not, however, bias the comparison between experimental and control groups.

A final limitation was differential attrition. One-sixth (N=11) of the 61 participants who were employed at baseline were dropped from the analysis because they contributed fewer than nine months of data. That is problematic because the analyses suggest that employment at baseline was associated with greater odds of obtaining employment during the study. Furthermore, rates of attrition were approximately 15 percentage points higher for the control group compared with the experimental group (retention rates of 90% and 75%, respectively, in the experimental and control groups). Attrition may be

problematic if participants left the study because they obtained employment.

CONCLUSIONS

Our data indicate that being assigned to a Housing First group was associated with initially lower odds of employment, highlighting the need for adjunctive supported-employment services. Concerning earnings, Housing First had no statistically significant impact on income from government sources, employment, or street activities. More research is needed to determine how supported employment may be effectively combined with supported housing to help people who are homeless and have a mental illness attain their vocational goals.

TABLE 5. Sources of monthly income reported by Housing First participants and members of a control group with moderate needs for services^a

Income source	Housing First						Control						Regression model (N=1,103) ^b		
	First month (N=689)		Last month (N=656)		Income during last month, in Canadian \$ ^c		First month (N=509)		Last month (N=447)		Income during last month, in Canadian \$ ^c		Marginal mean	95% CI	p
	N	%	N	%	Median	IQR	N	%	N	%	Median	IQR			
Total	610	89	624	95	873	589–1,000	417	82	422	94	830	571–969	8.19	–26.31 to 42.69	.642
Government support	602	87	610	93	820	575–950	398	78	399	89	790	555–925	27.49	2.67 to 57.66	.040
Competitive employment	13	2	26	4	356	200–1,200	15	3	22	5	450	240–1,200	–17.90	–58.02 to 17.15	.288
Street activities	63	9	43	7	100	50–360	44	9	34	8	200	50–600	–19.79	–43.85 to 4.26	.107
Illegal activities ^d	24	4	14	2	400	200–1,500	21	4	18	4	800	400–2,000			

^a The first month refers to the first month for which data were reported, and the last month refers to the last month for which data were reported, for a median follow-up of 745 days.

^b The full regression models included age, sex, education, psychotic illness, alcohol use disorder at baseline, and site as covariates. The marginal mean is the difference in monthly income between the Housing First and control groups, in Canadian dollars.

^c Only for participants reporting that income source. IQR, interquartile range

^d Convergence of regression model not achieved because of zero-inflated data

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