RESEARCH

Impact of a Housing First intervention on homeless Veterans with mental illness: a Canadian multisite randomized controlled trial

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ABSTRACT

Introduction: A large proportion of homeless Veterans live with severe mental health problems. We examine the impact of a Housing First program that included recovery-oriented initiatives (assertive community treatment or intensive case management) among those homeless Veterans who participated in a multisite demonstration project on homelessness and mental health. **Methods:** The data come from a Canadian multisite randomized trial (ISRCTN42520374), At Home/Chez Soi, with a volunteer sample of 2,285 homeless or precariously housed individuals living with mental health problems. Of this sample, 98 individuals reported being Veterans, of whom 57 were randomized to the intervention group and 41 to the control group. The data come from self-reported measures administered at baseline and after 6, 12, 18, and 24 months from Fall 2009 to Spring 2013. Data were analyzed by fitting a mixed model for each outcome variable, and special attention was given to the event × treatment × Veteran status interaction term. **Results:** The Housing First approach was effective in improving housing stability, social functioning, and quality of life in homeless Veterans with mental health problems. These results are consistent with the intervention's effectiveness with other homeless Canadians with mental health problems. **Discussion:** These results are consistent with those of previous US studies and suggest that a Housing First approach that includes recovery-oriented support would effectively contribute to reducing homelessness in the Canadian Veteran population.

Key Words: homeless persons, housing, mental health, Veterans

RÉSUMÉ

Introduction: Une proportion importante de vétérans itinérants vit avec de sévères troubles de santé mentale. Nous examinons l'impact d'un programme de type *Logement d'abord*, incluant des interventions basées sur le rétablissement (Suivi intensif dans le milieu ou Suivi d'intensité variable) parmi les vétérans itinérants qui ont participé à un projet de démonstration multi-sites sur l'itinérance et la santé mentale. **Objectif:** Examiner l'effet d'une approche *Logement d'abord* sur la stabilité domiciliaire, le fonctionnement social et la qualité de vie de vétérans itinérants avec des troubles de santé mentale. **Méthodes:** Les données proviennent d'un essai randomisé (ISRCTN42520374) multi-sites mené au Canada, *At Home/Chez Soi*, avec un échantillon volontaire de 2 285 personnes itinérantes ou précairement logées vivant avec des troubles de santé mentale. De cet échantillon, 98 personnes se sont identifiées comme vétérans, dont 57 ont été randomisées au groupe d'intervention et 41 au groupe contrôle. Les données proviennent de mesures autorapportées administrées à l'entrée dans l'étude et après 6, 12, 18 et 24 mois, de l'automne 2009 au printemps 2013. Les données ont été analysées pour chaque variable dépendante à l'aide de modèles mixtes et une attention spéciale a été portée à l'effet d'interaction temps x traitement x statut de vétéran. **Résultats:** L'approche *Logement d'abord* s'est avérée efficace pour améliorer la stabilité domiciliaire, le fonctionnement social et la qualité de vie de vétérans itinérants vivant

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avec des troubles mentaux. Cet effet de l'intervention est conforme à celui observé auprès d'autres Canadiens itinérants vivant avec des troubles de santé mentale. **Conclusions:** Ces résultats sont similaires à ceux d'études américaines antérieures et suggèrent qu'une approche de type *Logement d'abord* incluant un soutien basé sur le rétablissement pourrait contribuer efficacement à la réduction de l'itinérance parmi les vétérans canadiens.

Mots clés: logement, personnes itinérantes, santé mentale, vétérans

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INTRODUCTION

In Canada, estimates are that one in four Veterans may struggle to adjust to the transition from military life to civilian life. In a Canadian survey, 25% of Veteran respondents reported a difficult adjustment to civilian life, exemplified by worse health, disability, and determinants of health status than the general population. Most respondents attributed these challenges to their military service, and around 50% of those respondents who were Veterans Affairs clients had been diagnosed with a mental health problem by a health professional.[1] Another survey of Veterans in transition found that finding work, mental health, and healthy relationships with spouse and family were the most important factors in a successful transition.[2] These difficulties, among other causes, may lead to problems such as mental illness and homelessness.[3,4] In 2013, 7% of the homeless population of Toronto reported having some military service.[5] In addition, a recent study conducted in five Canadian cities (Moncton, Montreal, Toronto, Winnipeg, and Vancouver) observed that 4.2% of a sample of homeless people with severe and chronic mental illness identified as Veterans.[6]

The United States recently adopted a Housing First approach to address Veteran homelessness.[7] Contrary to more conventional Treatment First or Housing Readiness approaches, Housing First does not require sobriety or compliance with medical or psychiatric treatment to directly access permanent housing. Rather, its clients are housed in scattered-site, privately owned units as soon as possible. Engagement in treatment of addictions or mental illness is then left to the client's discretion, with the support of a multidisciplinary team of professionals.[8] Research conducted with US Veterans has suggested that there is no empirical support for the practical importance of requiring sobriety at program entry to achieve positive outcomes on a wide array of housing and clinical variables such as number of suicide attempts, frequency of suicide ideation, episodes of depression, and use of psychiatric medication (although differences often reached statistical significance, effect sizes were either small or negligible).[9]

Earlier studies of the US Department of Housing and Urban Development Veterans Affairs Supportive Housing (HUD-VASH) transitional programs suggested that they yield better housing and clinical outcomes for Veterans than alternative treatments, including clinical support alone.[7,10,11] A HUD-VASH housing program that included intensive case management (ICM) support yielded better housing outcomes, especially for Veterans with co-occurring disorders and Veterans with more active substance use, than transitional housing support alone.[12] The effectiveness of housing programs was also observed for homeless female Veterans.[13] The women in the intervention group displayed, on average, fewer psychiatric symptoms, higher mental functioning, more social support, more days worked, and fewer days of homelessness.

The objective of this article is to study the impact of a Housing First intervention on housing stability, social functioning, and quality of life (QOL) in a Canadian sample of homeless Veterans with mental health problems. This article adds to the existing literature by testing a Housing First intervention in Canada with Veterans of both sexes over a 2-year follow-up period, with a randomized controlled trial of both psychosocial and housing outcomes.

METHOD

At Home/Chez Soi study

This study used data from At Home/Chez Soi (AH/CS), the largest study of its kind in the world. AH/CS is a multisite, randomized effectiveness study that took place in Canada from 2009 to 2013 in the cities of Vancouver, Winnipeg, Toronto, Montreal, and Moncton. Its goal was to determine the effectiveness of an intervention using a Housing First approach including recovery initiatives of either an Assertive Community Treatment (ACT) team or an ICM team.[14] ACT is a community-based, multidisciplinary mental health intervention team that is available 24/7, with a typical service provider-to-user ratio of 1:10. ICM is more of a brokerage model in which a case manager links users

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to readily available mental health and housing services. The typical ICM caseload is around 20 users.[15]

The AH/CS study was registered with the International Standard Randomised Controlled Trial Number registry and assigned ISRCTN42520374. Research ethics board (REB) approvals were obtained from universities or health care institutions at each of the five sites, along with REB approval from the university-affiliated teaching hospital in which the coordinating centre was based.[16]

Study design

For this article, a subgroup analysis was performed to assess the effectiveness of the intervention for the subsample composed of military Veterans. Many issues surround the definition of *Veteran*. The study question used wording from the census before 2006, emphasizing war service. Since 2006, the legal definition has been broadened to include those with any prior Canadian military service. The broader definition is consistent with the responses of study participants and was used for this article. Data from five time points (baseline and 6, 12, 18, and 24 months) were used for both the intervention (INT) and treatment-as-usual (TAU) groups. The initial design called for a 24-month follow-up period. However, the final interview was moved to 21 months for approximately half the participants because of time and financial constraints.

Intervention

Participants randomized to the INT group received Housing First in combination with either ICM or ACT. Housing First recipients were housed in a privately owned apartment of their choice from a pool of affordable units within a week of being randomized. They received subsidies from the program that ensured that no more than 30% of their total income would be allotted to rent. Assignment to either ICM or ACT was based on need level (except in Moncton, where all participants randomized to the INT group received ACT support), as determined by the baseline score on the Multnomah Community Ability Scale (MCAS): Participants at a high need level (MCAS score of 47 or less) were assigned to ACT (32 Veterans, 658 non-Veterans), and those with low or moderate needs (MCAS score of 48 or more) received ICM support (25 Veterans, 551 non-Veterans). All participants had to consent to at least one weekly visit from a support team (ICM or ACT) member, without having to commit to treatment. Participants in the control group receiving TAU could benefit from existing housing options, treatments, and resources already available in the community.

Participants

Participants were referred by community agencies such as shelters, soup kitchens, drop-in centers, inpatient programs, and mental health teams or self-referred to the study. Trained research assistants used a questionnaire to determine eligibility. Inclusion criteria were as follows: homeless, defined as either absolutely homeless (no regular, fixed physical shelter) or precariously housed (primary residence was a single room occupancy, rooming house, or hotel or motel) with two or more episodes of being absolutely homeless in the past year;[14] presence of a mental disorder as determined by the Mini International Neuropsychiatric Interview;[17] and legal adult (age 18 or older at most sites). Applicants were excluded if they were a current client of an ICM or ACT program or if they had some housing and were thus relatively homeless (regular housing that fails to meet basic standards).[14]

When a participant met all eligibility criteria, informed written consent was obtained, and baseline data were collected. The participant was then randomized to either the INT or the TAU arm. Randomization was done electronically using adaptive randomization techniques[18] except for the 44 participants from Moncton's rural arm (including one Veteran), who were not randomized. Instead, a matched comparison sample was recruited after filling the INT arm.

A total of 2,298 participants were enrolled in the study from October 2009 to August 2011, of whom 2,255 (1,265 INT and 990 TAU) provided the information required to perform the analyses for this study. Participants were followed for 24 months, and data were collected every 3 months. The item used to identify Veterans was the following: "Have you ever had any wartime service in the military forces of Canada or its allies?" This item, taken from the 2006 census, was administered with no emphasis on wartime because Veteran participants might never have been deployed. However, the phrasing of the item makes it possible that we underestimated the number of Veterans in the sample if we consider the more current Veterans Affairs Canada definition. Of the 2,255 participants retained for this study, 98 (4.3%) identified themselves as Veterans (57 in the INT group, 41 in the TAU group). The characteristics of the sample are presented in Table 1.

Table 1. Sample Characteristics

Characteristic	Veterans		Non-Veterans	
	INT (*n* = 57)	TAU (*n* = 41)	INT (*n* = 1,208)	TAU (*n* = 949)
Gender, %				
Male	79	78	67	68
Female	19	22	33	31
Transsexual or transgender	2	0	<1	1
Age at enrollment, Mean (SD)	44 (11)	46 (12)	41 (11)	41 (11)
Study site, %*				
Moncton	4	20	8	10
Montreal	18	7	23	19
Toronto	25	20	24	28
Vancouver	26	27	23	20
Winnipeg	28	27	22	23
Language, %				
English	65	68	61	61
French	12	12	20	18
Other	23	20	19	21
Ethnicity, %				
White	51	56	50	49
Aboriginal	23	17	22	21
Other	26	27	28	30
Education, %				
Did not complete high school	33	34	58	56
Completed high school	25	24	17	20
Some postsecondary education	42	42	25	24

* Totals may exceed 100% because of rounding.
INT = intervention; TAU = treatment as usual.

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Compared with non-Veterans, the Veteran sample was more predominantly male, older, and more educated. At baseline, according to Mini International Neuropsychiatric Interview scores, 54.5% of Veterans presented with a major depressive episode, 40.4% with posttraumatic stress disorder, 34.3% with a psychotic disorder, and 27.3% with a panic disorder. Substance dependence and alcohol dependence each affected roughly 40% of the Veteran sample, and 38.4% of the sample displayed moderate or high suicidality.

Measures

This article examines the effect of the intervention on three main outcomes: housing stability, social functioning, and QOL. These outcomes were measured at all five time points using the instruments described below. All questionnaires, including screening instruments, were administered by research assistants after extensive training.

Housing stability

Housing stability was assessed through a derived variable computed for each time point as the number of days spent in stable housing divided by the total number of days considered for the interview (3 mo). The raw data were obtained using the Residential Time-Line Follow-Back Inventory (RTLFB).[19] Stable housing was defined as a residence in which the expected length of

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stay is more than 6 months, without intention to move, with tenancy rights. It includes houses and apartments (the participants' or another person's – e.g., a parent or a spouse – but not arrangements that are only temporary) or group homes (with or without support). Because the housing stability distribution was severely bimodal (modes at 0% and 100%), this outcome variable was dichotomized using 50% as the cut-off point.

Social functioning

Social functioning was assessed with the MCAS. The MCAS measures functional ability on four dimensions (health, adaptation, social skills, and behaviour) through 17 interviewer-rated items. Each item is scored on a 5-point scale, with higher scores denoting higher functionality. Total score is obtained by summing the ratings for each item, with scores of 63 and higher reflecting a high level of functioning (little disability), scores ranging from 48 to 62 denoting a moderate level of functioning (some disability), and scores of 47 and lower indicating a low level of functioning (higher levels of disability), as per the proposed criterion scores.[20] Reported inter-rater reliability (>0.85 with interview probes), test–retest reliability (>0.70), and validity (statistically significant criterion and predictive validity) are adequate.[20,21] To facilitate interviewer rating on each item, an interview guide was also developed.[21]

Quality of life

QOL was measured using the 20-item Quality of Life Index (QoLi–20).[22] The original scale was designed to assess the QOL of people with severe and persistent mental illness.[23] The QoLi–20 is a structured self-report interview, administered by a trained non-clinical interviewer, and elicits participants' ratings of their QOL. Each item is scored on a 7-point scale, with a score of 7 indicating high satisfaction. The total score ranges from 20 to 140 and is the sum of the scores of individual items.[22] Psychometric properties reported by validation studies are adequate (item discrimination indices > 0.75, item–test correlations > 0.60, Cronbach's $\alpha > 0.70$ for all subscales but two, for which $\alpha > 0.60$).[23,24]

Data analysis

In addition to descriptive statistics, we fitted linear mixed models,[25] using Stata version 12 (StataCorp LP, College Station, TX), to repeated continuous outcome variables, namely MCAS score (model 1) and QoLi–20 score (model 2). The dichotomized housing stability variable was modelled using a logistic mixed-effects model (model 3). The decision to use linear mixed models was made to take full advantage of the presence of five time points while minimizing the impact of randomly missing data.[14] In all models, we included the baseline level of the outcome as a covariate and modelled time with a set of dummy-coded event indicators

Table 2. Descriptive Statistics of Social Functioning and Quality of Life

Time point	Veterans						Non-Veterans					
	INT			TAU			INT			TAU		
	n	Mean	SD	*n*	Mean	SD	*n*	Mean	SD	*n*	Mean	SD
Social functioning (MCAS score)												
Baseline	57	59.6	9.5	41	59.5	7.6	1,208	59.6	8.7	949	59.6	8.6
6 months	54	62.2	8.2	32	61.0	7.4	1,039	63.9	8.6	687	62.1	8.5
12 months	51	65.2	9.7	27	61.8	8.1	1,036	64.3	8.3	701	62.5	8.6
18 months	50	64.3	8.9	24	63.7	7.9	978	64.7	8.4	677	62.8	9.2
24 months	48	65.4	8.0	30	62.3	9.5	1,028	65.0	9.0	699	63.2	9.2
Quality of Life (QoLi–20 score)												
Baseline	56	71.3	23.4	39	69.7	21.7	1,181	71.8	22.3	938	71.9	23.0
6 months	54	84.8	20.2	30	74.1	21.7	1,015	86.0	21.1	679	80.3	22.2
12 months	50	90.2	22.6	27	80.7	18.2	1,017	88.6	21.6	689	84.8	21.6
18 months	50	82.6	26.2	24	81.9	14.2	966	87.6	22.3	655	85.0	21.5
24 months	50	88.1	24.9	29	85.2	15.3	1,033	89.0	22.4	709	86.3	22.6

INT = intervention; TAU = treatment as usual; MCAS = Multnomah Community Ability Scale; QoLi–20 = 20-item Quality of Life Index.

Table 3. Descriptive Statistics of Housing Stability

Time point	Veterans						Non-Veterans					
	INT			TAU			INT			TAU		
	n	f	%	n	f	%	n	f	%	n	f	%
Baseline	55	6	11	33	2	7	1115	98	9	827	70	9
6 months	55	41	75	36	8	23	1163	874	75	861	208	24
12 months	54	40	74	32	9	28	1145	909	79	825	271	33
18 months	52	37	71	31	10	33	1104	846	77	782	311	40
24 months	50	42	84	29	8	28	1017	770	76	697	309	44

Note: Housing stability = in stable housing 50% or more of the previous 3 months.
INT = intervention; TAU = treatment as usual.

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(6, 12, 18, and 24 months). To test for a differential effect of the intervention among Veterans, we included a group × Veteran status interaction term in each model. A statistically significant result would indicate a different intervention effect in the Veteran group than in the non-Veteran group. All analyses were performed on an intention-to-treat basis. The Housing First intervention was treated as a dichotomous variable (INT vs. TAU) because both ACT support[26] and ICM support[27] had a statistically significant, positive impact on MCAS, QoLi–20, and RTLFB scores.

RESULTS

Descriptive statistics

Table 2 presents the descriptive statistics for social functioning and QOL from baseline to 24 months for Veterans and non-Veterans in both the INT and TAU groups. Table 3 summarizes the results for housing stability. For Veterans and non-Veterans in both groups, there was a trend toward improvement over time for all outcomes.

Multivariate analyses

Analyses pooling participants receiving either ICM or ACT as support with the Housing First approach showed an intervention × time effect on social functioning, QOL, and housing stability. All parameter estimates were in the expected direction, suggesting a greater increase over time in social functioning, QOL, and time spent in stable housing for the INT group than for the TAU group (Table 4).

Table 4 also contains the results for the event × treatment × Veteran status interaction term. When controlling for gender, age, study site, and need level, there was no significant residual effect of the event × treatment × Veteran status interaction term, suggesting that the effect of the intervention is similar for both Veterans and non-Veterans alike on social functioning, QOL, and

Table 4. Estimates, Intervention, and Intervention × Veteran Status Interaction

Outcome and term	Estimate	SE	z	*p*	95% CI
MCAS					
INT	1.75	0.38	4.66	< 0.001	1.01–2.48
INT × VET	0.78	1.35	0.58	0.56	–1.86 to 3.42
QoLi–20					
INT	6.22	0.94	6.62	< 0.001	4.38–8.07
INT × VET	–0.23	3.50	–0.07	0.95	–7.10 to 6.63
RTLFB					
INT	4.17	0.27	15.29	< 0.001	3.63–4.70
INT × VET	0.50	0.84	0.60	0.55	–1.14 to 2.14

MCAS = Multnomah Community Ability Scale; INT = intervention; VET = Veteran; QoLi–20 = 20-item Quality of Life Index; RTLFB = Residential Time-Line Follow-Back Inventory.

housing stability. Figures 1–3 illustrate the variation over time of social functioning (Figure 1), QOL (Figure 2), and housing stability (Figure 3) for four groups: Veterans in the INT group, non-Veterans in the INT group, Veterans in the TAU group, and non-Veterans in the TAU group. All three outcomes show similar trajectories over time of Veterans and non-Veterans in either the INT group or the TAU group.

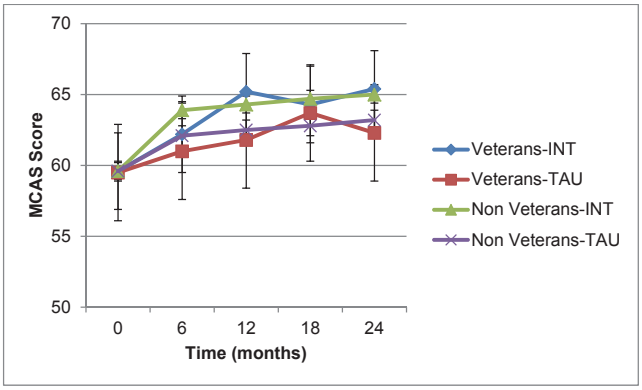

Figure 1. Social functioning progression by subgroup (95% CI)

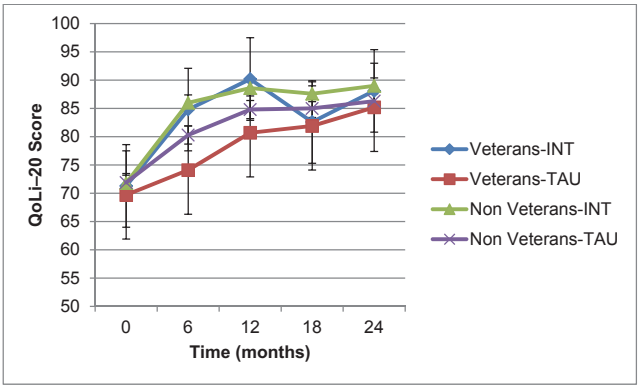

Figure 2. Quality of life progression by subgroup (95% CI)

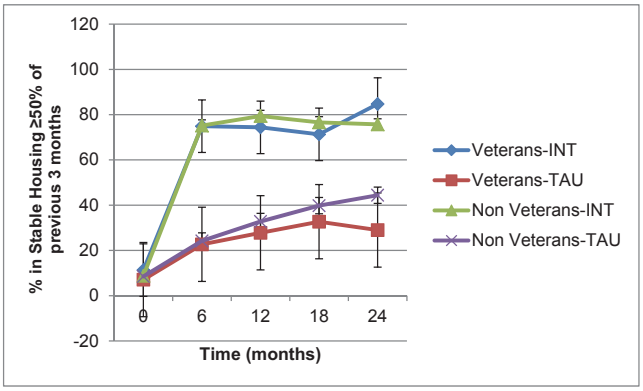

Figure 3. Housing stability progression by subgroup (95% CI)

DISCUSSION

This Canadian Housing First intervention improved the housing stability, social functioning, and QOL of homeless Veterans with mental health problems. This finding is congruent with results for non-Veterans in the AH/CS study and results for Veterans in the United States.[28] The intervention had positive outcomes during the first 12 months that persisted through to 24 months. The favourable outcomes observed after 12 months were in line with the US results.[7] The extra year of follow-up in this study provides evidence of the intervention's lasting benefits.

However, this study presents a few limitations. The Veteran sample size (n = 98) limited the power to detect small differences and, given the dearth of Canadian data on homeless Veterans with severe and persistent mental illness, it is not possible to clearly assess the actual representativeness of our sample. The small Veteran sample size also contributed to our decision to combine the types of clinical support (either ICM or ACT) provided along with housing. It is therefore impossible to determine whether the two clinical support models are comparably effective, or even whether the positive outcomes were driven mainly by one of the two interventions. Because the type of support provided was determined according to the participant's need level, it was not possible to perform a more refined analysis. Results from studies of supported housing programs, including Housing First, have consistently demonstrated that Veterans benefit from these programs, similar to other homeless populations.

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COMPETING INTERESTS

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DISCLAIMER

The views expressed herein are solely those of the authors.

CONTRIBUTORS

Jimmy Bourque helped select the research questions and data set, analyzed the results, and drafted the manuscript. Linda VanTil analyzed the results and drafted the manuscript. Brianna Kopp, Faye More, Jacinthe LeBlanc, Jitender Sareen, and Stefanie Renee LeBlanc collected the data. All authors edited and revised the manuscript and approved the final version submitted for publication.

ETHICS APPROVAL

The AH/CS study was registered with the International Standard Randomised Controlled Trial Number registry and assigned ISRCTN42520374. Research ethics board (REB) approvals were obtained from universities or health care institutions at each of the five sites, along with REB approval from the university-affiliated teaching hospital in which the coordinating centre was based.

INFORMED CONSENT

Informed consent was obtained from the participants.

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