Correlates of Veteran Status in a Canadian Sample of Homeless People With Mental Illness

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ABSTRACT

Many veterans at risk of homelessness also suffer from mental health problems. The aim of this study was to identify correlates of veteran status among housing, mental health, and service use variables in a Canadian sample of homeless people with mental illness. The data were obtained from At Home / Chez Soi, a Canadian multisite study. The participants were 99 veterans and a matched comparison group of 297 non-veterans. Data were gathered at baseline and were analyzed using logistic regression. The veteran and non-veteran groups were found to be similar, although veterans attended school longer, and were more likely to have been victims of a robbery in the 6 months prior to enrolment in the study. Veterans were not overrepresented in this sample as compared with the general population.

Keywords: veterans, homelessness, mental health, service use, victimization

RÉSUMÉ

Plusieurs vétérans à risque d'itinérance souffrent également de troubles de santé mentale. Le but de cette étude était d'identifier des variables corrélées au statut de vétéran parmi des facteurs liés au logement, à la santé mentale et à l'utilisation des services dans un échantillon canadien d'itinérants et d'itinérantes souffrant de troubles mentaux. Les données provenaient d'une étude pancanadienne, At Home / Chez Soi. Les participants et participantes étaient 99 vétérans ainsi qu'un groupe de comparaison apparié de 297 non-vétérans. Les données ont été recueillies lors de l'entrée dans l'étude et ont été analysées à l'aide de régressions logistiques. Les deux groupes étaient similaires, bien que les vétérans aient été scolarisés davantage et qu'ils soient plus susceptibles d'avoir été victimes d'un vol dans les 6 mois précédant l'entrée dans l'étude. Les résultats suggèrent que les deux groupes sont similaires. Les vétérans ne sont pas surreprésentés dans cet échantillon.

Mots clés : vétérans, itinérance, santé mentale, utilisation des services, victimisation

About 25% of the veteran[1] population of Canada may have difficulties in making the transition from a military life to a civilian life (Thompson et al., 2011), and these challenges can lead to other problems, such as addictions, mental illness, and homelessness (Ray & Forchuk, 2011; Veterans Affairs Canada, 2013). Currently, there is little data available on veterans in the homeless population and on their mental health (Veterans Affairs Canada, 2013). The risk factors for veterans could be different from those of the civilian population, and expanding on this information could help develop proper programs for this subset of individuals in need.

The objective of this study was to identify correlates of veteran status among housing, mental health, and service use variables in a Canadian sample of homeless people with severe and persistent mental illness. The results could help identify challenges specific to the veteran homeless population.

BACKGROUND

Studies have observed a link between homelessness and mental illness in the general population (Frankish, Hwang, & Quantz, 2005) and also in the veteran population (Bossarte, Blosnich, Piegari, Hill, & Kane, 2013). Trainor, Taillon, and Pandalangat (2011) link mental health directly with housing, thus making it difficult to separate the two in research. Specifically, a bidirectional relationship between mental health and homelessness seems to exist in which homelessness increases the risk of suffering from mental

health issues and, in turn, mental illness increases the chances of individuals becoming homeless (Canadian Institute for Health Information, 2007).

Homelessness

Gaetz, Donaldson, Richter, and Gulliver (2013) estimate that there are approximately 200,000 people who are homeless each year in Canada. The exact number of these who are veterans is unknown, but there are likely thousands (Canadian Veterans Advocacy, 2013). In 2013, the City of Toronto released its Street Needs Assessment report in which 7% of the homeless population in the Toronto area reported having some military service. The homeless veterans, like most homeless people, live in poverty and must also contend with mental illness, alcohol abuse, and Canada's extreme winters (Canadian Veterans Advocacy, 2013).

Although most people are homeless for less than a month, Gaetz et al. (2013) state that between 2% and 4% of the homeless population can be considered chronic. The chronicity of homelessness, of life on the streets and in shelters, can create trauma and lead to addiction, abuse, and suicide (Trypuc & Robinson, 2009). Ray and Forchuk (2011) conducted a qualitative study on a sample of Canadian homeless veterans. In this sample, men felt that their difficulty in transitioning from military service to a civilian life that is less structured contributed to their homelessness. This transition from military to civilian life could also affect mental health and substance use. Other factors that may influence homelessness for veterans as well as non-veterans include income level, employment status, and problems with housing (Canadian Institute for Health Information, 2007).

Mental Illness and Addiction

Studies show that the prevalence of substance abuse and mental illness is higher in homeless populations than in the general population (Canadian Institute for Health Information, 2007). Although difficult to accurately determine, the estimates of the prevalence of affective disorders among homeless people in Canada and the United States range from 20% to 40% (Hwang, 2001). Therefore, it can be presumed that the homeless veteran population would also suffer from a high prevalence of mental illness. For example, Pearson, Janz, and Ali (2013) estimate that less than 10% of Canadians reported mood or anxiety disorders in 2012, while the prevalence in veterans in Canada was estimated at about 20% (Thompson et al., 2011). Homeless veterans have identified alcohol dependence and abuse, and mental health problems as major issues (Ray & Forchuk, 2011). It is possible to hypothesize that trauma experienced during military service may heighten the risk of suffering from mental illness and alcohol dependence. Eleven percent of veterans suffer from post-traumatic stress disorder (PTSD) (Thompson et al., 2011), which could be directly linked to their combat operations. Ray and Forchuk's (2011) sample of homeless veterans reported that they used alcohol to deal with the posttraumatic stress, depression, and anxiety disorders from which they suffer. They also believed that alcohol was their drug of choice because drinking while off duty was part of military life.

Purpose and Contribution of the Present Study

Studies, predominantly in the United States, have linked mental illness and homelessness in veteran populations (Ghose, Gordon, Metraux, & Justice, 2011). American research has also provided prevalence

estimates of homelessness among veterans (Montgomery, Fargo, Byrne, Kane, & Culhane, 2013) and established that women veterans are more at risk (Fargo et al., 2012). Comparative studies in the United States (Tsai, Mares, & Rosenheck, 2012) and the United Kingdom (Woodhead et al., 2011) also suggest that homeless veterans and non-veterans have few differences. However, in Canada, little is known regarding the proportion of the homeless population represented by veterans, or how veteran and non-veteran homeless people might differ, for example in terms of mental health. With this paper, we intend to estimate the proportion of a Canadian sample of homeless people with mental illness who are veterans, and to identify correlates of veteran status in a matched sample of homeless people with mental illness.

METHOD

The At Home / Chez Soi Study

Our study used data from At Home / Chez Soi, a randomized controlled trial conducted in five cities in Canada: Vancouver, Winnipeg, Toronto, Montreal, and Moncton. The purpose of this study was to determine the effectiveness of Housing First, a combined housing and support intervention. The methods of this study have been described in Goering et al. (2011).

Participants were recruited from community agencies that serve the homeless, such as shelters, drop-in centres, mental health teams, inpatient programs, and criminal justice programs. Trained research assistants administered a screening questionnaire to determine eligibility. Participants were eligible if they met the following criteria: legal adult (aged 18 or older/19 in British Columbia); either absolutely homeless or precariously housed (see Goering et al. 2011 for definitions); and mental disorder with or without a coexisting substance use disorder, as determined by the Mini International Neuropsychiatric Interview (Sheehan et al., 1998). Participants were excluded if they met one or more of the following criteria: current client of an Assertive Community Treatment (ACT) or Intensive Case Management (ICM) program; no legal status as a Canadian citizen; landed immigrant, refugee, or refugee claimant; or relatively homeless.

If a participant met the eligibility criteria, informed written consent was obtained, and baseline information was collected. The participant was randomized to the intervention (INT) or treatment as usual (TAU) arm following the first interview. Randomization was done electronically using adaptive randomization techniques (Frane, 2008).

A total of 2,298 participants were enrolled in the study from October 2009 to August 2011 (1,289 INT, 1,009 TAU). Data were collected from participants at baseline on their demographic characteristics, clinical characteristics, service utilization, quality of life, and community integration. Participants were followed for a period of up to 24 months, and data were collected every 3 months.

The At Home / Chez Soi study was registered with the International Standard Randomized Control Trial Number Register and assigned ISRCTN42520374. Research Ethics Board (REB) approvals were obtained from universities or health-care institutions in each of the five sites, along with REB approval from the university-affiliated teaching hospital in which the coordinating centre was based (for a more in-depth analysis of the ethical challenges posed by this project and how they were addressed, we refer the reader to Silva, Goering, Jacobson, and Streiner, 2011).

Study Design

In this paper, we use only the baseline data collected at enrolment (one time point) of the At Home / Chez Soi study in order to identify correlates of veteran status in a population of homeless individuals suffering from severe and persistent mental illness.

Matching Procedure

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?" Given the age range of participants who answered positively to this item, we assumed that participants self-identifying as veterans included people having any former service in the Canadian military.

Out of a total of 2,298 participants, 99 (4.3%) identified themselves as veterans, while 2,182 (95.0%) had no service in the Canadian Armed Forces (see Table 1). Only 17 participants (0.7%) were excluded (eight didn't know, seven declined to answer, and two were missing an answer). This 4.3% figure suggests that the proportion of veterans among the homeless and mentally ill adult population is about 1.2 times more than expected (3.6%) considering the proportion of males and females in the sample (according to MacLean et al. 2013, 4.7% of adult Canadian males and 0.7% of females are veterans). This difference is not statistically significant according to a goodness-of-fit chi-square, χ^2 (1, 2281) = 3.32, p = 0.068.

Table 1
Distribution of Matching Variables in Original Sample

Matching variable	Veterans (n = 99)	Non-veterans (n = 2,182)
Gender (%)		
Male	78.8	67.1
Female	20.2	32.0
Transsexual/transgender	1.0	0.9
Age at enrolment: $\bar{X}$ (st. dev.)	44.70 (11.22)	39.94 (12.37)
30 or less (%)	12.2	22.0
31 to 40 (%)	22.4	24.8
41 to 50 (%)	33.7	32.7
51 to 60 (%)	22.4	17.0
61 or more (%)	9.2	3.5
Study site (%)		
Moncton	11.1	10.6
Montreal	13.1	20.8
Toronto	22.2	25.2
Vancouver	27.3	21.2
Winnipeg	26.3	22.3

A matched sample of 297 non-veterans was drawn out of the 2,182 participants who had answered negatively to the questionnaire item about veteran status. Each veteran was matched with three non-veterans on study site (Moncton, Montreal, Toronto, Winnipeg, or Vancouver), sex, and age (± three years). The procedure consisted of identifying a perfect match on site and sex, and then selecting the participants whose age was the closest to the veteran participant. When more than three matched the veteran participant equally, an online random number generator (http://www.random.org) was used to pick three participants. Note that the distribution by study site could not be exactly matched because of the small number of participants identifying as transgender or transsexual. Since we could not find enough exact matches on sex for these participants in every site, we decided to prioritize sex over site in the matching procedure. However, this decision affects less than 1% of participants in each group.

Participants

As shown in Table 2, the total sample used for data analysis included 99 veterans and 297 non-veterans. The characteristics are equivalent for both groups for sex, study site, and age, as these were used as matching variables. The veteran group includes a larger proportion of English-speaking participants than the non-veteran group, but not significantly so, χ^2 (2, 396) = 0.41, p = 0.817. The veteran subsample also includes slightly fewer people identifying as aboriginals, but again, this difference does not reach statistical significance, χ^2 (2, 396) = 0.39, p = 0.825. Veterans in the sample had higher levels of education than their counterparts, however. This difference is statistically significant, χ^2 (2, 396) = 15.44, $p < 0.001$, and education would reduce group classification errors by 18.4% ($\tau_b = 0.18$, T = 3.85, $p < 0.001$).[2]

Measures

All data used in this paper come from the screening and baseline interviews conducted with each participant prior to entry into the study and randomization. The variables considered were derived from the instruments described below.

Housing status. Housing status was determined using two items. The first one comes from the Screening Questionnaire and asks about the participant's current housing (precariously housed or absolutely homeless). The participant eligibility screening questionnaire was developed for the purposes of At Home / Chez Soi in order to formally regroup information pertaining to participant enrolment and eligibility in the study.

The second item comes from the Demographics, Service and Housing History (DSSH) questionnaire and reads: "In your lifetime, what is the total amount of time you have been homeless (months)?" The DSSH was created for the purpose of gathering basic, factual information from At Home / Chez Soi participants, such as gender, ethnicity, schooling, employment, and marital status. It borrows items from the 2006 Canada Census, the Toronto Board of Education 2006 Student Census, and the Community Mental Health Evaluation Initiative (CMHEI).

Physical health. Physical health was assessed using the Comorbid Conditions (CMC) questionnaire. Developed for the At Home / Chez Soi study, the CMC is an inventory-type instrument that assesses the presence or absence of specific physical health conditions participants may have (e.g., epilepsy, heart disease, and diabetes). The items of the CMC were inspired by a handful of instruments that have been used

Table 2
Sample Characteristics

Variable	Veterans (n = 99)	Non-veterans (n = 297)
Gender (%)		
Male	78.8	78.8
Female	20.2	20.2
Transsexual/transgender	1.0	1.0
Age at enrolment: $\bar{X}$ (st. dev.)	44.70 (11.22)	44.77 (11.09)
Study site (%)		
Moncton	11.1	11.1
Montreal	13.1	13.1
Toronto	22.2	22.6
Vancouver	27.3	27.6
Winnipeg	26.3	25.6
Language (%)		
English	65.7	62.3
French	13.1	15.2
Other	21.2	22.5
Ethnicity (%)		
White	52.5	49.5
Aboriginal	20.2	22.9
Other	27.3	27.6
Education (%)*		
Didn't complete high school	33.3	55.7
Completed high school	24.2	17.9
Some postsecondary education	42.6	26.4

Note. *Group difference (veterans vs. non-veterans) significant at $\alpha = 0.05$.

for similar purposes (the Canadian Community Health Survey and the National Population Health Survey, Statistics Canada; Mares & Rosenheck, 2007) and were adapted for language and comprehension suitability. Subsequent items to this instrument were added to assess the presence of traumatic brain injury.

Mental health. Participants' mental health was evaluated using two instruments: the Colorado Symptom Index (CSI) and the Mini International Neuropsychiatric Interview (MINI).

The CSI is a self-reported measure of psychological symptomatology that has been used in a variety of settings pertaining to mental health research (Shern et al., 1994). Specifically, the CSI is a 14-item instrument that assesses the presence and frequency of psychiatric symptoms that participants have experienced within the past month (e.g., "How often have you felt tense, nervous, worried or afraid?"). Responses are coded on a 5-point Likert scale ranging from 0 (*not at all*) to 4 (*at least every day*). Individual scores on the 14 items are summed to obtain a total score, with higher scores reflecting more mental illness symptomatology. The

CSI's reliability (test-retest over 0.70, Cronbach's alpha 0.90 or higher), convergent validity ($r = 0.50$ with the SF12), and content validity have been reported as good in two previous studies (Boothroyd & Chen, 2008; Conrad et al., 2001).

The MINI is a structured, diagnostic interview that was developed to meet the need for a short, reliable, and valid instrument for screening 17 Axis I psychiatric disorders, as per the DSM-IV. The MINI takes approximately 20 minutes to administer and is designed for psychiatric evaluation and outcome tracking in clinical psychopharmacology trials and epidemiological studies. Reported interrater and test-retest kappas for diagnoses used in this paper are all above 0.70, and both sensitivity and specificity are above 0.70 for all diagnoses used in our study (Sheehan et al., 1998).

As indicators of mental health, only the modules for diagnosis of major depressive episode, suicidality, manic and hypomanic episodes, post-traumatic stress disorder, psychotic disorders, and generalized anxiety disorders were used for this paper.

Alcohol and substance use. Information pertaining to alcohol and substance use was gathered with two instruments: the MINI, presented above, and the Global Appraisal of Individual Need Substance Problem Scale (GAIN-SPS).

From the MINI, modules assessing alcohol dependence/abuse and substance dependence/abuse were used.

The GAIN-SPS is a 16-item scale that assesses substance use and abuse and is based on the DSM-IV criteria for dependence (Dennis, Chan, & Funk, 2006). The GAIN-SPS measures are often used in both clinical and research contexts. For the purposes of the At Home / Chez Soi study, only the five items that comprised the GAIN short screener (GAIN-SS) for substance disorder were used.

GAIN-SPS responses are given in terms of timing of the problem described in each item (i.e., past month, 2–12 months ago, one or more years ago, and never), and scores are obtained by counting the number of symptoms manifested by the participant for each time frame. Specifically, a past-month score is obtained by summing the number of symptoms having been an issue in the past month (total score ranging from 0 to 5), a past year score by summing the number of symptoms having been an issue for the respondent in the past month as well as in the past year (total score ranging from 0 to 5), and a lifetime score by summing the number of symptoms having been an issue for the respondent in the past month, the past year, and over one year ago (total score ranging from 0 to 5). For this paper, only the past-year score was considered. Dennis, Chan, and Funk (2006) report good psychometric properties for the short form.

Social functioning. Social functioning was first measured using five items of the screening questionnaire described above. The responses to the items were provided by the person or agency that had referred the participant. These items assessed functional impairment regarding the participant's ability to meet his or her nutritional needs, to maintain a good personal hygiene, to access community resources, to maintain a social support network, and to manage personal finances.

Second, we also used the Multnomah Community Ability Scale (MCAS). The MCAS measures functional ability on four dimensions (health, adaptation, social skills, and behaviour) through 17 interviewer-rated items. To facilitate interviewer rating on each item, an interview guide was developed by Dickerson,

Origoni, Pater, Friedman, and Kordonski (2003). 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 above indicating a high level of functional ability (little disability), scores ranging from 48 to 62 a moderate level of functioning (some disability), and scores of 47 and under a low level of functioning (higher levels of disability), as per criterion scores proposed by Barker, Barron, McFarland, and Bigelow (1994). Reported interrater reliability, test-retest reliability, and validity are adequate (Barker et al., 1994; Dickerson et al., 2003).

Cognitive functioning. Three items of the DSSH, described above, were used as indicators of cognitive functioning. The three yes/no items asked of the participants whether (a) they had attended a special class in school, (b) had received extra help in school, and (c) had been told in the past that they had a learning disability.

Employment status. Information about employment status and income also comes from the DSSH. Four items were used. The first three were yes/no questions asking whether the participant was unemployed, whether his or her main source of income was disability payments from a public program, and whether his or her main source of income was welfare/social assistance. The fourth item asked about the participant's total income during the last month.

Health, social, and justice service use. Variables related to access to services and service use come from two instruments: the Health Service Access Items (ACC) and the Health, Social and Justice Service Use (HSJSU) questionnaire.

The ACC is composed of three items used to assess participants' access to medical care. These items were developed for the purposes of the study and were based on questionnaires used for similar purposes by Khandor and Mason (2007), Statistics Canada (2008), and Hwang et al. (2010). The items in the ACC pertain specifically to access to a regular medical doctor, or other medical resources available within the community.

The HSJSU instrument was developed specifically for the purposes of the At Home / Chez Soi study, as no single pre-existing service use questionnaire was identified as being able to fully capture the information required for some of its primary research questions and study population. To ensure comprehensive coverage of required information, we developed the HSJSU from seven existing instruments: Ambulatory Health Care Record (Guerriere et al., 2006), the Utilization and Cost Inventory (Kashner et al., 2009), the Cornell Service Index (Sirey et al., 2005), the Health Service Utilization Inventory (Browne, Arpin, Corey, Fitch, & Gafni, 1990), the Utilization of Hospital and Community Services Form (Forchuk, Brown, Schofield, & Jensen, 2008), the Client Socio-demographic and Service Receipt Inventory (Chisholm et al., 2000), and the Service Use Questionnaire for the Continuity of Mental Health Services (Adair et al., 2005). We also added items that were especially relevant to the study of mentally ill homeless adults, such as food bank service use, justice service use, or victimization.

Victimization (past 6 months). Victimization history in the past 6 months was documented using four items from the HSJSU. The items asked the participant whether he or she had been a victim of robbery, threats, assault, or sexual assault in the past 6 months. Participants answered either yes, no, or I don't know.

Data Analysis

Data analysis included descriptive statistics, and nine logistic regressions were used to assess whether probability of group membership (veterans vs. non-veterans) could be predicted by variables describing (a) housing status, (b) physical health, (c) mental health, (d) alcohol and substance use, (e) social functioning, (f) cognitive functioning, (g) employment status, (h) health, social, and justice service use, and (i) victimization.

RESULTS

Descriptive Statistics

Table 3 presents the descriptive statistics for variables studied as possible correlates of veteran status. More than 75% of participants in both groups were absolutely homeless at time of enrolment in the study, and an overwhelming majority presented with at least one comorbid condition in addition to Axis I disorders. More than half of respondents were suffering from a major depressive episode when interviewed and about one third self-reported moderate or high levels of suicidality. About 90% of participants were unemployed, and health, social, and justice service use was generally high. Victimization was quite frequent. The prevalence of current PTSD in this sample is considerably higher, χ^2 (2, 396) = 6,796.44, $p < 0.001$, than that of the general Canadian adult population, reported to be 2.4% in 2008 by Van Ameringen, Mancini, Patterson, and Boyle.

Regression Analyses

Verification of assumptions yielded two minor problems. In the "physical health" model, the CMC score violated the linearity of logit assumption. A Box-Cox transformation (Osborn, 2013) of CMC score to correct for a severe departure from normality failed to solve the problem. Therefore, we used a dummy-coded version of the variable (0, 1, 2–3, 4–5, 6–10, and 11+ comorbid conditions) in the regression model. In the "cognitive functioning" model, we detected colinearity between self-assessment of having a learning disability and having been told by others. To solve the problem, although some degree of association was expected between cognitive functioning variables, we eliminated self-assessment of learning disability but retained the other predictors. To correct for multiple testing, we used the generalized Holm familywise error rate (*k*-FWER) procedure (Lehmann & Romano, 2005). We defined the nine tests of regression models as one family, and the sets of tests of regression coefficients within each regression model as nine other families.

Table 4 presents the results for the nine logistic regression models tested. Only the victimization variables yielded a statistically significant model, χ^2 (4, 396) = 14.71, $p = 0.005$, $R_N^2 = 0.06$, but it explained only 6% of the variation in the outcome variable (veteran vs. non-veteran) according to Nagelkerke's pseudo-R^2. Participants who had been victims of robbery in the 6 months preceding the study were 2.56 times as likely to be veterans, *Wald* (1, 396) = 10.41, $p = 0.001$, as participants who did not report being robbed. Participants suffering from PTSD were about as likely to be veterans as participants without this condition, as suggested by the non-significant *p*-value, *Wald* (1, 396) = 4.31, $p = 0.038$ (the corrected α was 0.01).

Table 3
Descriptive Statistics

Variable	Veterans (n = 99)	Non-veterans (n = 297)
Housing status		
Absolutely homeless (%)	84.7	76.2
Months of homelessness (median)	36.0	36.0
Physical health		
Comorbid conditions (%)		
0	5.1	8.1
1	6.1	8.4
2–3	19.2	20.9
4–5	31.3	22.9
6–10	31.3	32.7
11+	7.1	7.1
Mental health		
CSI: $\bar{X}$ (st. dev.)	38.50 (13.35)	40.11 (12.23)
Major depressive episode (%)	54.5	56.6
Mania/hypomania (%)	16.2	12.1
PTSD (%)	40.4	29.0
Panic disorder (%)	27.3	21.9
Mood disorder/psychotic features (%)	17.2	18.9
Psychotic disorder (%)	34.3	35.4
Suicidality: moderate/high (%)	38.4	26.3
Alcohol and substance use		
Alcohol dependence (%)	41.4	32.7
Substance dependence (%)	39.4	42.4
Alcohol abuse (%)	19.2	19.2
Substance abuse (%)	15.2	18.2
GAIN – Year score: $\bar{X}$ (st. dev.)	2.77 (2.04)	2.77 (2.04)
Social functioning		
MCAS: $\bar{X}$ (st. dev.)	59.67 (8.72)	59.24 (8.80)
Nutritional needs (%)	44.4	43.9
Personal hygiene (%)	38.4	34.8
Access resources (%)	73.7	78.0
Maintain social network (%)	71.7	74.3
Manage finances (%)	75.8	72.6

... continued

Table 3
(Continued)

Variable	Veterans (n = 99)	Non-veterans (n = 297)
Cognitive functioning		
Special class (%)	24.2	30.3
Extra help in school (%)	25.3	36.0
Learning disability (%)	26.3	30.3
Employment status		
Unemployed (%)	89.9	90.2
Main income: disability (%)	40.4	39.1
Main income: welfare (%)	41.4	46.1
Median monthly income ($)	618.00	612.00
Health, social, and justice service use		
Have a family doctor (%)	64.6	64.3
Place to go when sick (%)	84.8	80.1
Couldn't get health care – past 6 months (%)	51.5	49.5
Hospitalized – mental illness, past 5 years (%)	34.3	33.7
Received addiction treatment (%)	54.5	56.9
Arrested or incarcerated – past 6 months (%)	28.3	36.4
Night in health/justice institution – past 6 months (%)	89.9	87.9
ER visit (%)	60.6	56.0
Ambulance (%)	41.4	33.3
Food bank (%)	29.3	26.9
Court appearance (%)	26.3	27.7
Victimization (past 6 months)		
Robbery (%)	48.5	29.6
Threats (%)	46.4	42.1
Assault (%)	44.8	36.2
Sexual assault (%)	7.3	9.5

Note. CSI = Colorado Symptom Index. GAIN = Global Appraisal of Individual Need Substance Problem Scale. MCAS = Multnomah Community Ability Scale.

Table 4
Logistic Regression Models

Independent variables	Wald	*df*	Odds ratio	*p*
Housing status, χ^2 (2, 396) = 3.07, p = 0.22, R_N^2 = 0.01				
Absolutely homeless	2.45	1	1.63	0.12
Months of homelessness	0.41	1	1.00	0.52
Physical health, χ^2 (5, 396) = 3.72, p = 0.59, R_N^2 = 0.01				
Comorbid conditions				
1	0.05	1	1.15	0.83
2–3	0.48	1	1.47	0.49
4–5	2.22	1	2.19	0.15
6–10	0.64	1	1.53	0.42
11+	0.51	1	1.60	0.48
Mental health, χ^2 (10, 396) = 11.28, p = 0.34, R_N^2 = 0.04				
CSI	3.40	1	0.98	0.07
Major depressive episode	0.53	1	0.81	0.47
Mania/hypomania	1.46	1	1.50	0.23
PTSD	4.31	1	1.76	0.04
Panic disorder	1.12	1	1.37	0.29
Mood disorder/psychotic features	0.35	1	0.82	0.55
Psychotic disorder	0.01	1	1.02	0.93
Suicidality: low	0.37	1	1.23	0.54
Suicidality: moderate	0.39	1	1.31	0.53
Suicidality: high	1.27	1	1.68	0.26
Alcohol and substance use, χ^2 (5, 396) = 3.92, p = 0.56, R_N^2 = 0.02				
Alcohol dependence	2.45	1	1.58	0.12
Substance dependence	0.16	1	0.89	0.69
Alcohol abuse	0.00	1	0.99	0.98
Substance abuse	0.90	1	0.72	0.34
GAIN – Year score	0.13	1	0.97	0.72
Social functioning, χ^2 (6, 396) = 2.43, p = 0.88, R_N^2 = 0.01				
MCAS	0.27	1	1.01	0.61
Nutritional needs	0.01	1	0.98	0.92
Personal hygiene	0.73	1	1.26	0.39
Access resources	0.86	1	0.77	0.35
Maintain social network	0.30	1	0.86	0.59
Manage finances	0.53	1	1.22	0.47

... continued

Table 4
(Continued)

Independent variables	Wald	*df*	Odds ratio	*p*
Cognitive functioning, χ^2 (3, 396) = 5.25, p = 0.16, R_N^2 = 0.02				
Special class	0.16	1	0.86	0.69
Extra help in school	3.00	1	0.52	0.08
Learning disability	0.93	1	1.40	0.34
Employment status, χ^2 (4, 396) = 1.14, p = 0.89, R_N^2 = 0.00				
Unemployed	0.00	1	0.99	0.97
Main income: disability	0.02	1	0.96	0.89
Main income: welfare	0.67	1	0.80	0.41
Monthly income	0.38	1	1.00	0.54
Health, social, and justice service use, χ^2 (11, 396) = 6.65, p = 0.83, R_N^2 = 0.03				
Have a family doctor	0.34	1	0.86	0.56
Place to go when sick	0.73	1	1.34	0.39
Couldn't get care – past 6 months	0.05	1	1.06	0.82
Hospitalized – psych., past 5 years	1.19	1	1.81	0.28
Received addiction treatment	0.01	1	0.97	0.92
Arrested/incarcerated – past 6 months	2.42	1	0.61	0.12
Night in institution – past 6 months	0.67	1	1.41	0.41
ER visit	0.00	1	1.00	0.99
Ambulance	0.79	1	1.31	0.37
Food bank	0.60	1	1.24	0.44
Court appearance	0.34	1	1.21	0.56
Victimization, χ^2 (4, 396) = 14.71, p = 0.01, R_N^2 = 0.06*				
Robbery*	10.41	1	2.56	< 0.01
Threats	0.74	1	0.76	0.39
Assault	0.61	1	1.27	0.44
Sexual assault	2.70	1	0.45	0.10

Note. CSI = Colorado Symptom Index. GAIN = Global Appraisal of Individual Need Substance Problem Scale. MCAS = Multnomah Community Ability Scale.
*Significant at α = 0.01.

DISCUSSION

The goal of the study was to identify correlates of veteran status among a set of housing, mental health, and service use variables in a Canadian sample of homeless people with severe and persistent mental illness. Veterans comprised 4.3% of a sample of adult homeless people with severe and persistent mental illness, which is not statistically different from their expected representation given the composition of our sample. They were more likely to be male, and were, on average, older than non-veterans with mental disorders, which is in line with results of American studies (Fargo et al., 2012). Veterans and non-veterans who are homeless and suffer from mental illness are, in fact, quite similar, and both also generally have poor physical health.

The main differences between veterans and non-veterans are that veterans are more educated, and are significantly more likely to report having been robbed in the 6 months prior to enrolment in the study than non-veterans. The higher level of education among veterans in a sample of homeless people is consistent with results obtained by Rosenheck and Koegel (1993) as well as Tsai, Mares, and Rosenheck (2012) in the United States. However, to our knowledge, the higher prevalence of robbery has not been documented elsewhere. Given the exploratory nature of this study, the reader should interpret this finding with caution until further evidence corroborating veterans' increased vulnerability to robbery is obtained.

While the high prevalence of PTSD in veterans has been described recently in a Canadian report (Thompson et al., 2011), our study observes that this is not significantly the case in a homeless population, although PTSD in our sample (veterans and non-veterans) is greater than 10 times as prevalent than in the Canadian general adult population (Van Ameringen et al., 2008). The prevalence of PTSD in our sample is not significantly different for veterans and non-veterans. The general similarity between the two subgroups might be explained by three phenomena. First, it is possible that the non-veteran sample was worse off to start with, considering that military service is contingent on, for example, passing a physical exam. This screening process might have yielded a healthier and more educated veteran sample even long before the start of the study. The lack of difference in our results could then actually be indicative of a significant deterioration within the situation of the 4.2% veterans who ended up in our sample. Second, it can be hypothesized that street life can be so pathogenic as to bring veterans and non-veterans to a similar level of mental strain, which could translate into the equivalent prevalence of various disorders in both groups. Third, given the serious toll that homelessness and mental illness take on people, life expectancy is considerably reduced in this subgroup of the population. We might therefore be witnessing a case of the "healthy survivor effect," which could explain the similarities between veterans and non-veterans in that our sample might be predominantly composed of the individuals in each group who were alive and healthy enough to participate in the study.

The main limitation of this study relates to the use of research data for secondary purposes. In this case, since the At Home / Chez Soi study was not originally designed to study veterans per se, only one item was included in the instrumentation to address this subsample. The item asks specifically about wartime service rather than more general military service that may or may not have involved actual deployment. Although the distribution of participants who answered affirmatively to this item suggests that it was more broadly interpreted, it is not possible to assess the extent to which respondents interpreted the question in a consistent manner. Thus, it is possible that our study actually underestimates the proportion of veterans in the sample. Also, although the sample size ($N = 396$) is adequate for continuous predictors and those representing fairly

frequent events, it is likely to yield low power for rare events, that is, events affecting less than 10% of the sample.

In the context of practice and policy-making, the present study suggests that veterans and non-veterans mostly face the same challenges. However, qualitative studies in the United States (Applewhite, 1997) and Canada (Ray & Forchuk, 2011) document the many barriers to care that homeless veterans face, but also what appear to be successful approaches. Applewhite (1997) suggests the need for more sensitive case-management services, affordable housing, employment opportunities, and empowering approaches. Ray and Forchuk (2011) suggest that veterans perceive themselves as different from non-veterans, and that this difference should be acknowledged when it comes to treatment:

> All the veterans stated that they were different than the rest of the homeless population because of their service in the military. They felt that fellow veterans understood and could support each other more so than the general homeless population. Therefore, the majority felt that there should be shelters or transitional housing designed for veterans to deal not only with alcohol and drug addiction but mental illnesses including post-traumatic stress disorder. (p. 19)

The homeless population, regardless of its veteran status, presents with many issues that need to be addressed, including poor physical and mental health, problems with social functioning, unemployment, and victimization. The evaluation of interventions targeting homeless people with mental illness with a cohort of veterans would be an appropriate direction for future research endeavours. For example, transitional housing has shown promising outcomes in the United States with veteran populations (McGuire, Rosenheck, & Kasprow, 2011; Schinka, Casey, Kasprow, & Rosenheck, 2011), and the Housing First model is gaining a very strong evidence base (see for example Goering et al., 2014, and Stefancic & Tsemberis, 2007). Also, comparing the situation of various categories of veterans—for example, those who participated in combat operation or peacekeeping missions with those who were never deployed, or Regular Force with Reserve Force veterans—could prove informative.

NOTES

1. There are many issues around the definition of veteran. The study question used wording from the census prior to 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 paper.
2. The likelihood ratio was used instead of Pearson's chi-square test to account for non-quadricity of the contingency table. Effect size computed is Kendall's tau-b.

REFERENCES

Adair, C. E., McDougall, G. M., Mitton, C. R., Joyce, A. S., Wild, T. C., Gordon, A. … Beckie, A. (2005). Continuity of care and health outcomes among persons with severe mental illness. *Psychiatric Services, 56,* 1061–1069. doi:10.1176/appi.ps.56.9.1061

Applewhite, S. L. (1997). Homeless veterans: Perspectives on social service use. *Social Work, 42*(1), 19–30. doi: 10.1093/sw/42.1.19

Barker, S., Barron, N., McFarland, B. H., & Bigelow, D. A. (1994). A community ability scale for chronically mentally ill consumers. *Community Mental Health Journal, 30,* 459–472. doi:10.1007/BF02207489

Boothroyd, R. A., & Chen, H. J. (2008). The psychometric properties of the Colorado Symptom Index. *Journal Administration and Policy in Mental Health and Mental Health Services Research, 35*(5), 370–378. doi:10.1007/s10488-008-0179-6

Bossarte, R. M., Blosnich, J. R., Piegari, R. I., Hill, L. L., & Kane, V. (2013). Housing instability and mental distress among US veterans. *American Journal of Public Health, 103*(2), S213–S216. doi:10.2105/AJPH.2013.301277

Browne, G. B., Arpin, K., Corey, P., Fitch, M., & Gafni, A. (1990). Individual correlates of health service utilization and the cost of poor adjustment to chronic illness. *Medical Care, 28*(1), 43–58. doi:10.1097/00005650-199001000-00006

Canadian Institute for Health Information. (2007). *Improving the health of Canadians: Mental health and homelessness.* Ottawa: Author.

Canadian Veterans Advocacy. (2013). *Pennies for veterans.* Retrieved September 17, 2013, from http://www.canadianveteransadvocacy.com/pennies.html

Chisholm, M. R., Knapp, M. R. J., Knudsen, H. C., Amaddeo, F., Gaite, L., & van Wijngaarden, B. (2000). Client socio-demographic and service receipt inventory – European version: Development of an instrument for international research. *British Journal of Psychiatry, 177*, s28–s33. doi:10.1192/bjp.177.39.s28

City of Toronto. (2013). *Street needs assessment results.* Retrieved September 18, 2013, from http://www.toronto.ca/legdocs/mmis/2013/cd/bgrd/backgroundfile-61365.pdf

Conrad, K. J., Yagelka, J. R., Matters, M. D., Rich, A. R., Williams, V., & Buchanan, M. (2001). Reliability and validity of a modified Colorado Symptom Index in a national homeless sample. *Mental Health Services Research, 3*(3), 141–153. doi:10.1023/A:1011571531303

Dennis, M. L., Chan, Y., & Funk, R. R. (2006). Development and validation of the GAIN Short Screener for internalizing, externalizing and substance use disorders and crime/violence problems among adolescents and adults. *American Journal on Additions, 15*, 80–91. doi:10.1080/10550490601006055

Dickerson, F. B., Origoni, A. E., Pater, A., Friedman, B. K., & Kordonski, W. A. (2003). An expanded version of the Multnomah Community Ability Scale: Anchors and interview probes for the assessment of adults with serious mental illness. *Community Mental Health Journal, 39,* 131–137. doi:10.1023/A:1022610620391

Fargo, J., Metraux, S., Byrne, T., Munley, E., Montgomery, A. E., Jones, H., … Culhane, D. (2012). Prevalence and risk of homelessness among US veterans. *Preventing Chronic Disease, 9*(E45). doi:10.5888/pcd9.110112

Forchuk, C., Brown, S. A., Schofield, R., & Jensen, E. (2008). Perceptions of health and health service utilization among homeless and housed psychiatric consumer/survivors. *Journal of Psychiatric and Mental Health Nursing, 15,* 399–407. doi:10.1111/j.1365-2850.2007.01246.x

Frane, J. W. (2008). A method of biased coin randomization, its implementation and its validation. *Drug Information Journal, 32,* 423–432. doi:10.1177/009286159803200213

Frankish, C. J., Hwang, S. W., & Quantz, D. (2005). Homelessness and health in Canada: Research lessons and priorities. *Canadian Journal of Public Health, 96,* S23–S29.

Gaetz, S., Donaldson, J., Richter, T., & Gulliver, T. (2013). *The state of homelessness in Canada 2013.* Toronto: Canadian Homelessness Research Network Press.

Ghose, T., Gordon, A., Metraux, S., & Justice, A. (2011). Mental illness and homelessness among veterans. *Psychiatric Services, 62*(12), 1514–1515. doi:10.1176/appi.ps.002942011

Goering, P. N., Streiner, D. L., Adair, C., Aubry, T., Barker, J., Distasio, J., … Zabkiewicz, D. M. (2011).The At Home / Chez Soi trial protocol: A pragmatic, multi-site, randomised controlled trial of a Housing First intervention for homeless individuals with mental illness in five Canadian cities. *BMJ Open, 1*(2), e000323. doi:10.1136/bmjopen-2011-000323

Goering, P. N., Veldhuizen, S., Watson, A., Adair, C., Kopp, B., Latimer, E., … Aubry, T. (2014). *National At Home / Chez Soi final report.* Calgary: Mental Health Commission of Canada.

Guerriere, D. N., Ungar, W. J., Corey, M., Croxford, R., Tranmer, J. E., Tullis, E., & Coyte, P. C. (2006). Evaluation of the ambulatory and home care record: Agreement between self-reports and administrative data. *International Journal of Technology Assessment in Health Care, 22*(2), 203–210. doi:10.1017/S0266462306051026

Hwang, S. W. (2001). Homelessness and health. *Canadian Medical Association Journal, 164*(2), 229–233.

Hwang, S. W., Ueng, J. J. M., Chiu, S., Kiss, A., Tolomiczenko, G., Cowan, L., … Redelmeier, D. A. (2010). Universal health insurance and health care access for homeless persons. *American Journal of Public Health, 100*(8), 1454–1461. doi:10.2105/AJPH.2009.182022

Kashner, M. T., Stensland, M. D., Lind, L., Wicker, A., Rush, A. J., Golden, R. M., & Henley, S. S. (2009). Measuring use and cost of care for patients with mood disorders. *Medical Care, 47*(2), 184–190. doi:10.1097/MLR.0b013e31818457b8

Khandor, E., & Mason, K. (2007). *The street health report 2007.* Toronto, ON: Creative Commons.

Lehmann, E. L., & Romano, J. P. (2005). Generalizations of the familywise error rate. *Annals of Statistics, 33,* 1138–1154. doi:10.1214/009053605000000084

MacLean, M. B., VanTil, L., Kriger, D., Sweet, J., Poirier, A., & Pedlar, D. (2013). *Well-being of Canadian Forces veterans: Canadian community health survey 2003*. Charlottetown: Veterans Affairs Canada, Research Directorate.

Mares, A. S., & Rosenheck, R. A. (2007). *HUD/HHS/VA collaborative initiative to help end chronic homelessness national performance outcomes assessment: Preliminary client outcomes report.* West Haven, CT: Northeast Program Evaluation Center.

McGuire, J., Rosenheck, R. A., & Kasprow, W. J. (2011). Patient and program predictors of 12-month outcomes for homeless veterans following discharge from time-limited residential treatment. *Administration and Policy in Mental Health, 38*(3), 142–154. doi:10.1007/s10488-010-0309-9

Montgomery, A. E., Fargo, J. D., Byrne, T. H., Kane, V., & Culhane, D. P. (2013). Universal screening for homelessness and risk for homelessness in the veterans health administration. *American Journal of Public Health, 103*(2), S210–S211. doi:10.2105/AJPH.2013.301398

Osborne, J. W. (2013). *Best practices in data cleaning.* Thousand Oaks, CA: Sage.

Pearson, C., Janz, T., & Ali, J. (2013). *Mental and substance use disorders in Canada. Health at a glance.* September. Statistics Canada catalogue no. 82-624-X. Retrieved from www.statcan.gc.ca/pub/82-624-x/2013001/article/11855-eng.htm

Ray, S. L., & Forchuk, C. (2011). *The experience of homelessness among Canadian forces and allied forces veterans*. University of Western Ontario. Retrieved September 18, 2013, from http://homeless.samhsa.gov/ResourceFiles/Homelessness%20Vets%20 Article.pdf

Rosenheck, R., & Koegel, P. (1993). Characteristics of veterans and nonveterans in three samples of homeless men. *Hospital & Community Psychiatry,44*(9), 858–863.

Schinka, J. A., Casey, R. J., Kasprow, W., & Rosenheck, R. A. (2011). Requiring sobriety at program entry: Impact on outcomes in supported transitional housing for homeless veterans. *Psychiatric Services, 62*(11), 1325–1330. doi:10.1176/appi.ps.62.11.1325

Sheehan, D. V., Lecrubier, Y., Harnett-Sheehan, K., Amorim, P., Janavs, J., Weiller, E., … Dunbar, G. (1998). The Mini International Neuropsychiatric Interview (M.I.N.I.): The development and validation of a structured diagnostic psychiatric interview. *Journal of Clinical Psychiatry, 59*(suppl. 20), 22–33.

Shern, D. L., Wilson, N. Z., Saranga Coen, A., Patrick, D. C., Foster, M., Bartsch, D. A., & Demmler, J. (1994). Client outcomes II: Longitudinal client data from the Colorado treatment outcome study. *Milbank Quarterly, 72*(1), 123–148. doi:10.2307/3350341

Silva, D. S., Goering, P. N., Jacobson, N., & Streiner, D. L. (2011). Off the beaten path: Conducting ethical pragmatic trials with marginalized populations. *IRB: Ethics and Human Research, 33*(3), 6–11. doi:10.2307/23048292

Sirey, J., Beyers, B. S., Teresi, J. A., Bruce, M. L., Ramirez, M., Raue, P. J., … Holmes, D. (2005). The Cornell Service Index as a measure of health service use. *Psychiatric Services, 56*(12), 1564–1569. doi:10.1176/appi.ps.56.12.1564

Statistics Canada. (2008). *Canadian community health survey (CCHS) 2008 questionnaire.* Ottawa, ON: Author. Retrieved from www.statcan.gc.ca/imdb-bmd/instrument/3226_Q1_V5-eng.pdf

Stefancic, A., & Tsemberis, S. (2007). Housing First for long-term shelter dwellers with psychiatric disabilities in a suburban county: A four-year study of housing access and retention. *Journal of Primary Prevention, 23*(3–4), 265–279. doi:10.1007/s10935-007-0093-9

Thompson, J. M., MacLean, M. B., Van Til, L., Sudom, K., Sweet, J., Poirier, A., … Pedlar, D. (2011). *Survey on transition to civilian life: Report on regular force veterans*. Charlottetown: Research Directorate, Veterans Affairs Canada; Ottawa: Director General Military Personnel Research and Analysis, Department of National Defence.

Trainor, J., Taillon, P., & Pandalangat, N. (2011). *Turning the key: Assessing housing and related supports for persons living with mental problems and illness.* Retrieved September 20, 2013, from http://www.mentalhealth commission.ca/ english/node/562

Trypuc, B., & Robinson, J. (2009). *Charity Intelligence Canada: Homeless in Canada.* Retrieved September 18, 2013, from http://www.charityintelligence.ca/images/Ci-Homeless-in-Canada.pdf

Tsai, J., Mares, A. S., & Rosenheck, R. A. (2012). Do homeless veterans have the same needs and outcomes as non-veterans? *Military Medicine, 177*(1), 27–31.

Van Ameringen, M., Mancini, C., Patterson, B., & Boyle, M. H. (2008). Post-traumatic stress disorder in Canada. *CNS Neuroscience & Therapeutics, 14*(3), 171–181. doi:10.1111/j.1755-5949.2008.00049.x

Veterans Affairs Canada. (2013). *VAC's response to the Office of the Veterans Ombudsman (OVO) observation papers.* Retrieved September 10, 2013, from http://www.veterans.gc.ca/eng/department/reports/ovo-response/ovo-homeless

Woodhead, C., Rona, R. J., Iversen, A. C., Macmanus, D., Hotopf, M., Dean, K., … Fear, N. T. (2011). Health of national service veterans: An analysis of a community-based sample using data from the 2007 adult psychiatric morbidity survey of England. *Social Psychiatry and Psychiatric Epidemiology, 46*(7), 559–66. doi:10.1007/s00127-010-0232-0