Schizophrenia Research 216 (2020) 460–469

Contents lists available at ScienceDirect

Schizophrenia Research

journal homepage: www.elsevier.com/locate/schres

Homeless youth with first-episode psychosis: A 2-year outcome study

Isabelle Sarah Lévesque [a, b], Amal Abdel-Baki [b, c, d, *]

[a] Jean-Talon Hospital, 1385 rue Jean-Talon Est, Montreal, QC, H2E 1S6, Canada
[b] Centre Recherche du Centre hospitalier de l'Université de Montreal (CRCHUM), 900 rue St-Denis, Montréal, QC, H2X0A9, Canada
[c] Department of psychiatry, Université de Montréal; Centre de recherche du Centre hospitalier de l'Université de Montreal, 1000 rue St-Denis, Montréal, QC, H2X 0C1, Canada
[d] Université de Montréal, Department of psychiatry, Canada

ARTICLE INFO

Article history:
Received 11 October 2018
Received in revised form
23 August 2019
Accepted 12 October 2019
Available online 31 December 2019

Keywords:
Homelessness
Psychosis
First-episode psychosis
Schizophrenia
Substance-related disorders
Severe mental disorders

ABSTRACT

Background: Psychosis augments the risk of homelessness, the latter is associated with increased morbidity and mortality. Young adults experiencing first-episode psychosis (FEP) are increasingly recognized as being vulnerable to homelessness. However, data on homeless in youth with FEP are sparse.
Objectives: To compare symptomatic and functional outcomes in homeless v. never homeless FEP, at admission and two years after admission to an Early Psychosis Intervention Service (EIS).
Method: From October 2005 to April 2011, 167 FEP consecutive admissions (aged 18–30 years old), were recruited in a 2-year prospective longitudinal study in an inner city EIS in Montreal, Canada. Socio-demographic characteristics, symptomatic and functional outcomes, as well as treatments and service use data were collected at admission and annually.
Result: 26% of FEP were homeless, prior or during the follow-up. Attrition rate was similar among the two groups. At baseline, the homeless group were more likely to have childhood abuse, forensic history, non-affective psychosis, negative symptoms, substance use disorder and cluster B personality.
Despite the intensive care of EIS, the similarity of illness severity at baseline and medication adherence rate, homeless FEP had poorer 2-year symptomatic and functional outcomes, although having more long-acting injectable antipsychotics (LAI) (vs oral antipsychotics), community treatment order and hospitalizations.
Conclusion: Homelessness is a serious and prevalent phenomenon among FEP youth associated with worse symptomatic and functional outcomes. More studies on interventions focusing on potentially modifiable factors (e.g. substance use disorders, social support) are warranted.
© 2019 Elsevier B.V. All rights reserved.

1. Introduction

Homelessness remains a persistent public health concern. In Canada, 235,000 persons experience homelessness every year (Gaetz, et al., 2016). Physical and mental health is poor among the homeless (Stephen Gaetz et al, 2016) (Vazquez et al., 2005) (Morrison, 2009). Two recent meta-analysis reported pooled psychosis prevalence of 11 and 13% respectively among homeless people (Folsom and Jeste, 2002) (Fazel et al., 2008), being even higher in younger age groups (Folsom and Jeste, 2002), compared to 1–3% in the general population (Perälä et al., 2007). Perhaps due to highly-variable methodologies, including definition of homelessness, sample selection and assessment tools, the prevalence of psychosis estimated among the homeless varies between studies and is probably underestimated because of selection and response biases. Indeed, individuals with psychosis are more likely to be excluded from studies on homelessness (e.g., not apt to consent, disorganized speech interfering with their capacity to answer questionnaires, refusal because of suspiciousness) and, when included, they may minimize or censor their symptoms.

Homelessness increases the risk of psychosis (Martijn and Sharpe, 2006), and psychosis heightens the risk of homelessness (Folsom et al., 2005) (Herman et al., 1998). Earlier investigations have found that homeless individuals with severe mental illnesses (ISMI) (versus housed ISMI) were more likely to be male (Folsom et al., 2005) (Tulloch et al., 2012), single (Folsom et al., 2005) (Tulloch et al., 2012) (Caton et al., 1994) (Caton et al., 1995), unemployed, have low income (Folsom et al., 2005) (Ran et al., 2006),

* Corresponding author. Centre hospitalier de l'Université de Montreal, 1000 rue St-Denis, Montréal, QC, H2X 0C1, Canada.
E-mail address: amal.abdel-baki@umontreal.ca (A. Abdel-Baki).

https://doi.org/10.1016/j.schres.2019.10.031
0920-9964/© 2019 Elsevier B.V. All rights reserved.

Abbreviations:

AUS:	Alcohol Use Scale
CDS	Calgary Depression Scale for Schizophrenia
CGI-S:	Clinical Global Assessment – Severity Scale
CHRN	Canadian Homelessness Research Network
CPA	Canadian Psychiatric Association
CTQ	Childhood Trauma Questionnaire
DUS:	Drug Use Scale
EPI	Early Psychosis Intervention program
GAF	Global Assessment of Functioning
PANSS	Positive and Negative Syndrome Scale
FEP	First Episode Psychosis
QLS	Quality of Life Scale
SOFAS	Social and Occupational Functioning Assessment Scale
SUD	Substance Use Disorder
TAQ	Tribunal administratif du Québec

poor family and social support (Tulloch et al., 2012) (Caton et al. 1994, 1995; Odell and Commander, 2000; Ran et al., 2006), childhood trauma (Herman et al., 1998) (Odell and Commander, 2000), involved and grappling with child protection services (Odell and Commander, 2000), legal problems (Tulloch et al., 2012) (Odell and Commander, 2000), personality disorders (Caton et al. 1994, 1995; Fazel et al., 2008) and substance-use disorders (SUD) (Folsom et al., 2005) (Tulloch et al., 2012) (Caton et al., 1994) (Caton et al., 1995) (Odell and Commander, 2000).

The mortality rate among homeless people with psychosis is 3–4 times the rate in the general population (Babidge et al., 2001), being especially high in younger age groups (Babidge et al., 2001) and more than twice the rate of housed individuals with psychosis (Mortensen and Juel, 1990). In FEP, the risk of suicide is particularly high during the first year of the initial contact with psychiatric services (Nordentoft et al., 2015). Nonetheless, homeless ISMI patients underuse mental health services (Bonin et al., 2009; Albert et al., 2017) (Bickley et al., 2006), are more likely to receive mental health treatment in hospitals rather than in outpatient clinics 8 (Folsom et al., 2005), have inadequately planned psychiatric hospitalization discharge (e.g., without follow-up appointment), more so if they have co-morbidity of 3 disorders: schizophrenia, substance abuse and antisocial personality disorder (Caton, 1995).

It is widely acknowledged that transition to adulthood is a critical stage. Psychosis usually starts in late adolescence or early adulthood and may threaten the successful completion of required developmental tasks (Malla et al., 2010). Among vulnerable young adults, homelessness can be a serious complication of psychosis, jeopardizing healthy transition to adulthood.

Although early psychosis evolution has been determined to be a strong predictor of long-term outcomes (Harrison et al., 2001), and early specialized psychosis intervention services have a positive impact on psychosis evolution (Malla et al., 2010) (Bertelsen et al., 2008) little is known about homelessness during the early stages of psychotic illness and its relationship to outcomes. Previous studies have reported prevalence rates of 5%–15% of homelessness in FEP cases at admission and 10–17% at 1-year follow-up (Ouellet-Plamondon et al., 2015), (Petersen et al., 2005). However, to our knowledge, none has investigated homelessness as a primary issue in a FEP cohort and its relation with outcomes.

2. Method

2.1. Objectives

The main objective is to compare the characteristics (socio-demographic, clinical and functional) at baseline, at 2 years among FEP youths who experience homelessness (prior to admission and/or during the first year of follow-up) to housed FEP subjects. The secondary objectives are to describe the prevalence, duration and course of homelessness before admission and throughout 2-year follow-up.

2.2. Sample and design

This prospective and retrospective, longitudinal, epidemiological cohort study was conducted at an Early Psychosis Intervention service (EIS) – Clinique des Jeunes Adultes Psychotiques (Clinique JAP) of Centre hospitalier de l'Université de Montréal (CHUM) – which offers care to all FEP patients from its defined inner city catchment area (225,000 inhabitants). The service provided intensive, specialized treatment of early psychosis based on early psychosis intervention guidelines from the Early Psychosis Guidelines Writing Group (2010). From October 2005 to April 2011, all FEP subjects admitted to Clinique JAP were asked to participate in the study (when their mental state was stabilized and if they were apt to sign informed consent).

2.3. Data collection

Data were collected prospectively (at admission and annually) by research interview and completed both prospectively and retrospectively (by chart review) by research assistant. Upon authorisation by the research ethic and scientific committees and the professional services director of the CHUM – the local authorised authority – to insure representativeness of the entire FEP population, particularly the homeless, data collection was undertaken by medical chart review for those who declined participation, since they could belong to a particular patient sub-group (e.g., more suspicious, disorganized) potentially prone to homelessness.

2.3.1. Homelessness: definition and group categorization

Numerous definitions of homelessness range from lack of a place to sleep to more inclusive parameters, such as the one proposed by the Canadian Government: "*Homelessness describes the situation of an individual without stable, permanent, appropriate housing, or the immediate prospect, means and ability of acquiring it. It is the result of systemic or societal barriers, lack of affordable and appropriate housing, individual/household financial, mental, cognitive, behavioral or physical challenges and/or racism and discrimination*" (Gaetz et al., 2012; Network, 2012). Homelessness status and history were collected with the latter definition.

FEP subjects with a history of homelessness (before admission, at admission or during the first year of follow-up) were grouped and compared to never homeless FEP patients. Those who became homeless only after the first year post-admission were not included in the homeless group (n = 2). The rationale was that post-1-year homelessness was too far from the admission time-point and too close to the 2-year time-point to investigate its impact on outcomes.

Based on Herman's categories (Herman et al., 1998) and the limited precision of information sources, the duration of homelessness was divided into 5 categories. When the available information was only partial, minimal confirmed duration was noted. As defined by the Canadian Homelessness Research Network (Gaetz et al., 2012), stable housing for at least 1 month was considered

as an exit from homelessness. Hospitalizations or incarcerations were not deemed to be exits from homelessness.

2.3.2. Measures

Data collected at admission and then annually included socio-demographics (age, gender, education level, marital status, immigration and "visible minority" status, income sources, legal problems), number and type of substances misused, medication type, dosage and route of administration, medication adherence (at 3 months and annually), community treatment orders as well as total services use over 2 years (emergency visits, number of hospitalizations, hospitalization days). Medication adherence was assessed by multiple sources as recommended by Velligan (Velligan et al., 2009) expert consensus on adherence, with the information provided by the patient himself/herself, file review (including information reported by the family, case manager and psychiatrist as well as laboratory measures).

Living arrangements and occupational status were scored according to scales adapted from Ciompi (1980): "independent" (in their own place alone or with a partner), "with parents" (with any family members), "supervised" (supervised apartment, group or foster home, hospital), and "homeless". For occupational status, the cohort was divided into 2 categories: "full or part-time work/study" (including competitive, rehabilitation or sheltered work) and "no occupational or productive activity". Inspired by Bernstein's Childhood Trauma Questionnaire (2003), childhood trauma experiences (including negligence, physical, psychological and sexual abuse, foster care placement, bullying, parents' separation, separation from caregiver(s) and caregiver's death) were collected from file reviews, clinician reports and patient interviews (when possible).

Symptoms and functioning were evaluated in those accepting to collaborate – according to scores assigned during research interviews, including the Positive and Negative Symptoms Scale (PANSS), the Calgary Depression Scale (CDS) and the Quality of Life Scale (QLS). Social support was estimated from 3 items of the QLS: item 1 (intimate relationships with household or family), item 2 (intimate relationships) and item 5 (social network), each rated from 0 (virtually absent) to 6 (adequate), giving total scores between 0 and 18.

The Social and Occupational Functioning Assessment Scale (SOFAS), the Global Assessment Scale (GAF), the Clinical Global Impression Severity Scale (CGI-S), the Drug Use Scale and the Alcohol Use Scale were administered, and the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) diagnoses (psychotic disorders, SUD and cluster B personality trait/disorder) were ascertained by the best-estimate consensus method (Roy et al., 1997), all available data being considering by at least 2 raters (1 senior psychiatry resident and 1 or 2 psychiatrists). Number of comorbidities was classified as follows: "double diagnosis" refers to a psychotic disorder combined with either personality disorder or substance use disorder (SUD), while "triple diagnosis" is combination of the latter 3 diagnoses. The best pre-morbid functioning level and the lowest illness severity level (both during adulthood, but prior to admission) were estimated from all available information, by GAF, SOFAS and CGI-S.

2.4. Statistical analysis

To assess the impact of attrition on representativeness of the residual 2-year sample (n = 134), individuals lost-to-follow-up (LTF) (n = 33) were compared to those still followed at 2 years on baseline socio-demographic, symptomatic and functional measures. To guard against potential participant bias on some measures (PANSS, QLS, CDS), interviewed individuals (n = 107) were compared to non-interviewed individuals (n = 60) on baseline socio-demographic, clinical and functional measures.

Homeless and housed patients were compared to determine the baseline and 2-year characteristics associated with homelessness. Descriptive statistics were performed on all variables at admission. Pearson's chi-square test for categorical variables (e.g., gender, diagnosis) and Student's T test (age and education level) or Wilcoxon and Mann-Whitney tests (all other variables, e.g., GAF and PANSS) were performed for continuous variables, if distributions were Gaussian or not. Bonferroni corrections for multiple tests were applied. Therefore the significance level was set to $\alpha \leq 0.002$. All p-values were 2-sided, and analyses were conducted with SPSS-24 (IBM Corporation, 2016 release).

3. Results

167 FEP patients were approached: 12.6% (n = 21) declined to participate (but were eventually included in retrospective file review of partial data). At 2 years, 19.8% (n = 33) were LTF, either because they moved to another town, quit treatment or were transferred to a Program for Assertive Community Treatment (PACT) team because of illness severity (Fig. 1).

3.1. Representativeness

In patients LTF at 2 years (compared to patients still followed), no differences were observed on all baseline variables.

No baseline differences were observed between the complete protocol group (with interview, n = 107) and the partial protocol group (without interview, n = 60) on all baseline variables.

3.2. Description of homelessness

Of the 167 patients, 44 (26%) experienced homelessness at some point: 10 (6%) were homeless at admission, 33 (20%) were homeless during follow-up, and 2 (1%) were homeless only after the first year of follow-up. Among the 40 homeless youths prior to admission, 60% (24/40) were still homeless or became homeless again during the first year, and 30% (12/40) during the second year. Of these 40 youths, 58% (23/40) experienced homelessness for 6 months or more, prior to admission, while 50% (20/40) experienced homelessness for more than 1 month after admission (Fig. 2). Note that for the majority, these categories are not mutually exclusive. Although, the first category <1 month could capture any homelessness of a day or more, all the homeless youth experienced it for a period of many days/weeks minimally.

3.3. Pre-morbid and baseline

Pre-morbid functioning (best lifetime GAF) and baseline quality of life, employment/education status and autonomy in living arrangements were lower in homeless patients (compared to never homeless patients). At baseline, although they were more likely to have non-affective psychosis, SUD and cluster B personality, no difference was observed between groups regarding psychosis severity (PANSS, CGI-S) (Table 1).

3.4. Two-year clinical and functional outcomes

Although both groups improved compared to baseline, the homeless group presented the poorest clinical and functional outcomes. Negative symptoms were the most prominent feature of the illness.

Throughout follow-up, homeless patients were more likely to have co-morbid drug use disorder (but not alcohol). During follow-up, 73% of the homeless had SUD at some point versus 53% of the never homeless. At 2 years, of those with SUD at baseline, similar

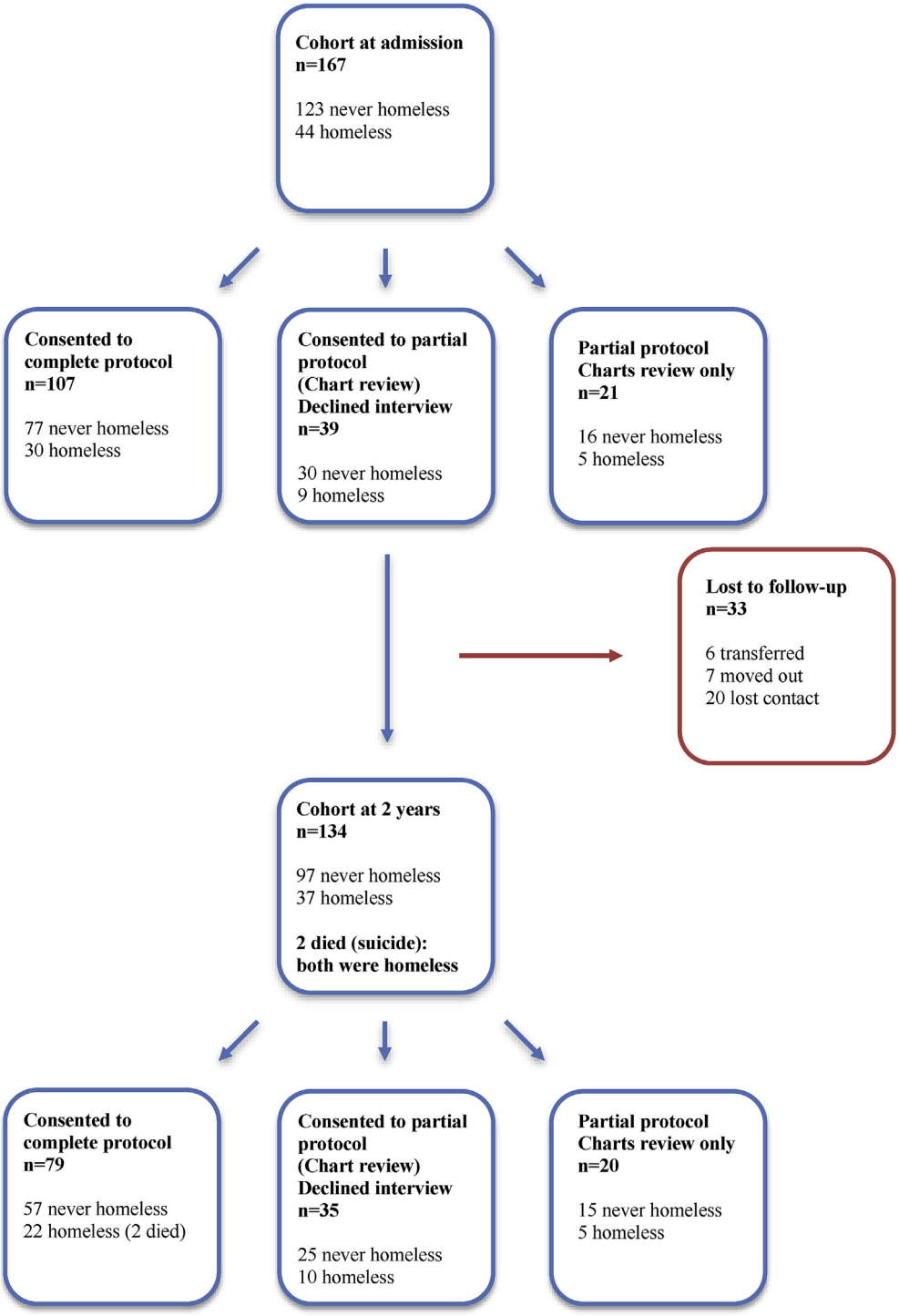

Fig. 1. Flowchart.

ratios of SUD persistence were observed in both groups (20/33 (61%) of the homeless v. 34/55 (62%) of the never homeless) (Tables 1 and 2).

3.5. Treatment and psychiatric services utilization

Very few subjects in both groups were classified as totally non-adherent (since in most of those cases of non-adherence, community treatment were ordered by the court). Pharmacological treatments (proportion of patients who were prescribed antipsychotics, mood stabilizers, clozapine, and mean antipsychotic dosage) were similar between groups. However, community treatment orders and long-acting injectable (LAI) antipsychotic medications were more frequent in the homeless group.

Hospitalization and emergency room use was higher in the homeless group during follow-up, compared to the never homeless group. Indeed, 77% of the homeless group versus 36% of the never homeless group were re-hospitalized after their first hospitalization.

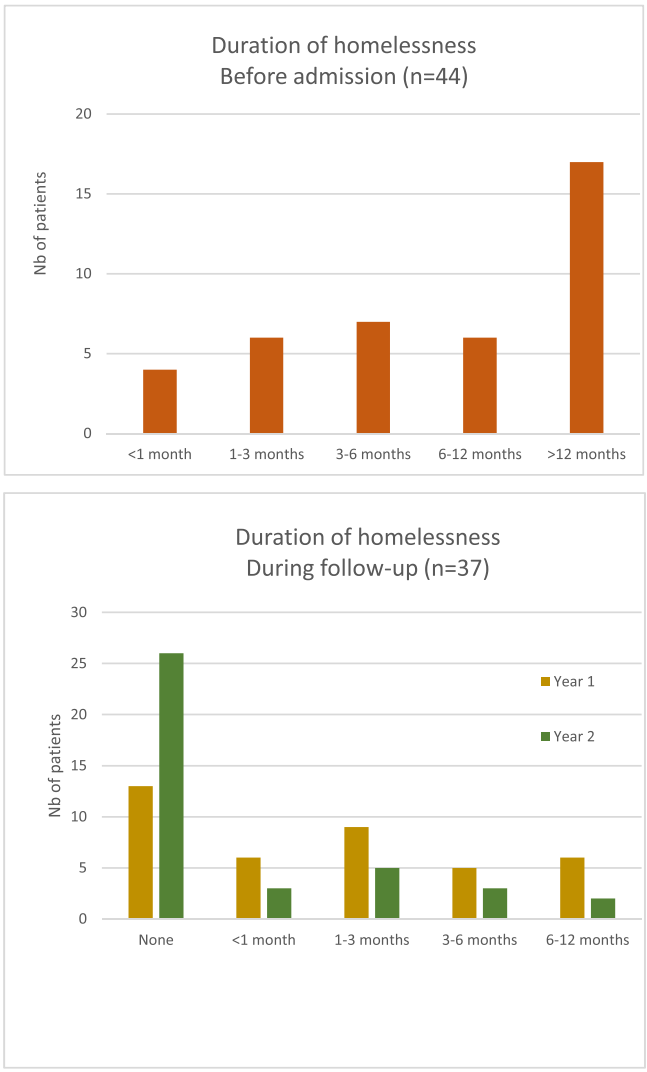

Fig. 2. Duration of homelessness.

3.6. Mortality

One man and one woman, both diagnosed with schizophrenia, committed suicide during the 2-year follow-up. Both had multiple SUD (alcohol, cannabis, amphetamines and/or cocaine) and experienced homelessness.

4. Discussion

4.1. Homelessness prevalence

A quarter of this urban FEP cohort experienced homelessness, for half of them homelessness persisted for more than one month, despite receiving services from an EIS. These proportions are higher than those generally reported in the literature 8 (Folsom et al., 2005) (Herman et al., 1998) (Petersen et al., 2005), (Barnes et al., 2000) (Harrison et al., 1994). Different hypotheses could explain the discrepancy.

First, the definition of homelessness, which varies across studies, may have been restrictive, including only roofless or sheltered homeless (Barnes et al., 2000) (Harrison et al., 1994) (Petersen et al., 2005), Harrison et al., (1994), or may have been broad (Folsom et al., 2005), incorporating those with temporary living arrangements and, sometimes, the definition is not mentioned (Barnes et al., 2000). In the present investigation, the definition was more inclusive, based on the Canadian definition (Gaetz et al., 2012), and allowed better identification of homeless youths, not limited to shelter users, thus encompassing young adults who "squatted", slept over at acquaintances' places for short periods of time, frequently moving from one place to another. Nevertheless, most of homeless FEP patients in this study used shelters at least at times, and were in that situation for many weeks or months (not only few days).

Second, the present study design allowed longitudinal homelessness assessment (i.e. during the whole duration of each year), in contrast to other studies where transversal assessments or assessments at some specific time points only were available (Drake et al., 2011) (Abdel-Baki et al., 2017) (like in our Tables 1 and 2). Furthermore our data collection, was also completed by chart review (therefore including collateral information) and not only self-reporting as it is the case in other studies (Herman et al., 1998; Drake et al., 2011) (Abdel-Baki et al., 2017), probably leading to underestimation of homelessness (memory biases, etc.).

Third, some authors have suggested that younger individuals are at increased risk of suffering from psychosis when homeless (Folsom et al., 2005) (Fournier et al., 2001) and of becoming homeless when suffering from psychosis (Tulloch et al., 2012) (Petersen et al., 2005) (Harrison et al., 1994). With mean patient age of 23 years, the present investigation comprised a younger group than in other studies (Herman et al., 1998) (Tulloch et al., 2012) (Harrison et al., 1994; Barnes et al., 2000; Drake et al., 2011). Moreover, some previous studies were undertaken in different socio-political settings including different countries and time periods (Harrison et al., 1994): whereas homelessness has increased since (Scott, 1993). Finally, 'Clinic JAP' EIS covers an urban area where homelessness is known to be prevalent (Fournier et al., 2001), in contrast to rural settings (Herman et al., 1998) (Scott, 1993). In line with the literature, most youths experienced homelessness before admission, early in the course of the disease (Scott, 1993; Drake et al., 2011).

4.2. Baseline characteristics

Baseline socio-demographics were similar to those reported previously among the homeless with psychosis (Odell and Commander, 2000; Folsom et al., 2005; Ran et al., 2006; Tulloch et al., 2012), non-affective psychosis (Folsom et al., 2005; Tulloch et al., 2012), SUD (Folsom et al., 2005) (Caton et al., 1994; Odell and Commander, 2000) (Caton, 1995) or cluster B personality (Caton et al., 1994) (Caton, 1995). Moreover, many factors linked with homelessness in the present study, such as schizophrenia diagnosis, severe negative symptoms, more comorbidities, childhood trauma, low education and poor social support network, have also been associated previously with poor psychosis outcomes (22,26,27,35). Even if the aim of and poor social support network, have also been associated previously with poor psychosis outcomes (Caton, 1995) (Harrison et al., 2001) (Malla and Payne, 2005) (Schubert et al., 2015). Even the mandate of the present study was not to distinguish between causes and consequences, characteristics associated with homelessness can be either causes or consequences of homelessness, and even both.

4.3. Attrition

Attrition, which was quite low (19.8%) compared to some other FEP studies (e.g., 31% at 2 years in the Danish OPUS trial) (Bertelsen et al., 2008), was not different between groups. However, in the homeless group, the higher proportion of community treatment orders and the legal obligations tributary of the QAT (being released under conditions, notably following treatment recommendations,

Table 1
Baseline characteristics of never homeless versus homeless FEP patients (n = 167).

	Entire cohort n = 167	Never homeless n = 123	Homeless n = 44	p-value
Socio-demographics				
Age, mean (s.d.)	23.2 (3.7)	23.2 (3.8)	23.3 (3.5)	0.857
Male, n (%)	124 (74)	85 (69)	39 (89)	0.011
Visible ethnic minority, n (%)	59 (36)	46 (38)	13 (31)	0.472
Years of education, mean (s.d.)	11.9 (3.1)	**12.5 (2.9)**	**10.1 (2.7)**	<0.001*
Single, n (%)	138 (83)	98 (80)	40 (91)	0.091
Pre-morbid GAF[a] (best lifetime), mean (s.d.)	65.4 (9.7)	**67.4 (9.1)**	**59.8 (9.2)**	<0.001*
Childhood trauma, n (%)				
Abuse	62 (37)	**36 (29)**	**26 (59)**	<0.001*
Neglect	35 (21)	**18 (15)**	**17 (39)**	<0.001*
Psychological abuse	38 (23)	**21 (17)**	**17 (39)**	<0.001*
Physical abuse	27 (16)	**12 (10)**	**15 (34)**	<0.001*
Sexual abuse	17 (10)	**11 (9)**	**6 (14)**	<0.001*
Foster care/placement, n (%)	26 (16)	**12 (10)**	**14 (32)**	0.001*
Separation from attachment figure, n (%)	83 (50)	**49 (40)**	**34 (77)**	<0.001*
Parents' divorce, n (%)	86 (51)	**52 (43)**	**34 (77)**	<0.001*
Living arrangements, n (%)				
Independent	99 (59)	**78 (63)**	**21 (48)**	<0.001*
With family	54 (32)	**44 (36)**	**10 (23)**	
Supervised housing	4 (2)	**1 (1)**	**3 (7)**	
Homeless	10 (6)	**0 (0)**	**10 (23)**	
Occupation, n (%)	77 (46)	**71 (58)**	**6 (14)**	<0.001*
Working	51 (31)	**45 (37)**	**6 (14)**	
Studying	31 (19)	**30 (24)**	**1 (2)**	
None	90 (54)	**52 (42)**	**38 (86)**	
Social support, mean (s.d.)	7.3 (2.6)	**7.8 (2.4)**	**6.0 (2.8)**	<0.001*
Legal status				
Legal problems, n (%)	47 (28)	**20 (16)**	**27 (61)**	<0.001*
NCR on the QAT[b], n (%)	7 (4)	**1 (1)**	**6 (14)**	0.001*
Primary diagnosis[c], n (%)				
Schizophrenia	39 (23)	**22 (23)**	**17 (49)**	0.002*
Schizoaffective disorder	39 (23)	**27 (28)**	**12 (34)**	
Bipolar disorder/Depressive disorder	44 (26)	**40 (41)**	**4 (11)**	
Other (psychosis NOS[d], delusional disorder)	10 (6)	**8 (8)**	**2 (6)**	
Co-morbidities				
Cluster B personality trait/disorder, n (%)	59 (35)	**32 (26)**	**27 (61)**	<0.001*
SUD[e], n (%)	88 (53)	**55 (45)**	**33 (75)**	0.001*
Alcohol	34 (20)	21 (17)	13 (30)	0.082
Cannabis	74 (44)	**44 (36)**	**30 (68)**	<0.001*
Cocaine	11 (7)	**2 (2)**	**9 (20)**	<0.001*
Amphetamines	21 (13)	**8 (7)**	**13 (30)**	<0.001*
Number of co-morbidities, n (%)				
None	63 (38)	**56 (46)**	**7 (16)**	<0.001*
Double diagnosis[f]	61 (37)	**47 (38)**	**14 (32)**	
Triple diagnosis[f]	35 (21)	**16 (16)**	**19 (54)**	
Psychopathology				
CGI-S[g], mean (s.d.)	4.7 (0.9)	4.7 (0.8)	5.0 (1.1)	0.172
PANSS[h] total, mean (s.d.)	73.0 (13.9)	71.3 (13.2)	77.3 (14.9)	0.084
Positive score	19.2 (5.6)	18.7 (5.6)	20.3 (5.5)	0.223
Negative score	18.9 (4.4)	18.1 (4.1)	20.8 (4.7)	0.006
General score	34.9 (6.5)	34.4 (6.2)	36.2 (7.1)	0.331
CDS[i], mean (s.d.)	6.2 (3.5)	6.6 (3.8)	5.3 (2.8)	0.102
Functioning				
GAF[j], mean (s.d.)	33.7 (10.6)	34.5 (11.03)	31.3 (9.09)	0.063
SOFAS[k], mean (s.d.)	38.7 (12.1)	40.1 (12.3)	34.66 (10.9)	0.012
QLS[l], mean (s.d.)	54.9 (21.7)	**62.1 (18.7)**	**35.8 (17.3)**	<0.001*
Treatment	7 (4)	4 (3)	3 (7)	0.312
Medication non-adherence at 3 months, n (%)				

* These results remain statistically significant after Bonferroni multiple comparison correction were applied Significance level: $p \leq 0.002$.
[a] Global assessment of functioning clinical scale.
[b] NCR: not criminally responsible on account of mental disorder/QAT: Quebec Administrative Tribunal.
[c] Based on final diagnosis at 2 years.
[d] Psychosis NOS: psychosis not otherwise specified.
[e] Substance use disorder.
[f] Double dx is psychotic disorder with either SUD or personality traits/disorder and triple dx is psychotic disorder with DUS and personality traits/disorder.
[g] Clinical global impression – severity.
[h] Positive and negative syndrome scale.
[i] Calgary depression scale.
[j] Global assessment of functioning clinical scale.
[k] Social and occupational functioning assessment scale.
[l] Qualify life scale.

Table 2
Two-year outcomes of never homeless versus homeless FEP patients (n = 134).

	Entire cohort n = 134	Never homeless n = 97	Homeless n = 37	p-value
Socio-occupational functioning				
Single, n (%)	106 (79)	75 (77)	31 (84)	0.178
Living arrangements, n (%)				
Independent	64 (48)	**51 (53)**	**13 (35)**	<0.001*
With family	46 (34)	**39 (41)**	**7 (19)**	
Supervised housing	21 (16)	**6 (6)**	**15 (41)**	
Homeless	0 (0)	**0 (0)**	**0 (0)**	
Occupation, n (%)	90 (67)	**73 (77)**	**17 (46)**	0.002*
Working	66 (49)	**54 (56)**	**12 (32)**	
Studying	32 (24)	**28 (29)**	**4 (11)**	
None	40 (30)	**22 (23)**	**18 (49)**	
GAF[a], mean (s.d.)	55.0 (14.9)	**57.5 (14.9)**	**48.1 (12.7)**	0.001*
GAF ≤50, n (%)	57 (42)	**34 (35)**	**23 (66)**	0.002*
SOFAS[b], mean (s.d.)	58.5 (12.6)	**60.7 (12.8)**	**52.1 (9.7)**	0.002*
SOFAS ≤50, n (%)	47 (35)	**25 (26)**	**22 (63)**	<0.001*
QLS[c], mean (s.d.)	80.9 (26.0)	**88.0 (23.7)**	**60.6 (21.6)**	<0.001*
Social support, mean (s.d.)	11.8 (3.4)	**12.7 (3.2)**	**9.3 (2.9)**	<0.001*
Legal problems, n (%)	17 (13)	**7 (7)**	**10 (27)**	<0.001*
Psychopathology				
CGI-S[d], mean (s.d)	2.8 (1.3)	2.7 (1.3)	3.2 (1.4)	0.033
PANSS[e], mean (s.d.)				
Total PANSS	49.0 (14.2)	46.1 (12.8)	57.7 (15.2)	0.003
Positive score	10.4 (3.9)	9.7 (3.6)	12.3 (3.9)	0.005
Negative score	14.0 (5.1)	**12.9 (4.7)**	**17.2 (5.2)**	0.002*
General score	24.7 (6.2)	23.5 (5.4)	28.5 (7.0)	0.005
CDS[f], mean (s.d.)	2.7 (3.3)	2.3 (3.1)	4.0 (3.6)	0.078
SUD[g] course, n (%)				
Persistence	54 (40)	34 (35)	20 (54)	0.039
New SUD	7 (5)	6 (7)	1 (3)	
Stopped	17 (13)	11 (11)	6 (16)	
Never SUD	54 (40)	46 (47)	8 (22)	
Co-morbidities, n (%)				
None	55 (41)	46 (48)	9 (24)	<0.001*
Double diagnosis[h]				
Personality traits/disorder	47 (35)	**25 (26)**	**22 (59)**	
Double diagnosis of SUD	61 (46)	**40 (41)**	**21 (57)**	
Triple diagnosis[i]	30 (22)	**14 (14)**	**16 (43)**	
Treatment				
Dosage of antipsychotic(s), mg_i	339.1 (315.9)	329.4 (332.7)	365.6 (267.2)	0.206
Clozapine, n (%)	8 (6)	6 (6)	2 (3)	0.884
Mood stabilizer, n (%)	55 (41)	43 (45)	12 (32)	0.281
Long acting antipsychotic (injectable), n (%)	52 (39)	**26 (27)**	**26 (70)**	<0.001*
Community treatment order, n (%)	29 (22)	**12 (12)**	**17 (46)**	<0.001*
Service utilization				
Hospitalizations, mean (s.d.)	2.0 (1.6)	**1.6 (1.3)**	**3.1 (1.6)**	<0.001*
Hospitalization days, mean (s.d.)	54.5 (60.1)	**36.4 (44.3)**	**95.9 (70.7)**	<0.001*
Emergency room visits, mean (s.d.)	0.53 (1.1)	0.39 (1.0)	0.68 (1.0)	0.044

* These results remain statistically significant after Bonferroni multiple comparison correction were applied Significance level: $p \leq 0.002$.
[a] Global assessment of functioning scale.
[b] Socio-occupational functioning scale.
[c] Qualify of life scale.
[d] Clinical global impression – severity.
[e] Positive and negative syndrome scale.
[f] Calgary depression scale.
[g] Substance use disorder.
[h] Double diagnosis is psychotic disorder with either SUD or cluster B personality traits/disorder and triple diagnosis is psychotic disorder with SUD and cluster B personality traits/disorder.
[i] Chlorpromazine equivalent.

declared NCR for a previous criminal offence on account of mental disorder) might have contributed to treatment adhesion. Moreover, intensive follow-up by the EIS team with frequent appointments, active reminders and outreach by case managers, with youth-engaging attitudes and satisfaction with help provided on issues other than mental health (e.g., to stabilize housing, get income source) might also contribute to the higher retention rate.

4.4. Two-year functioning and symptomatology

At 2-year follow-up, both groups improved, but clinical and functional outcomes were poorer in the homeless group. Despite better housing stability for most patients at 2 years, the QLS remained lower from baseline throughout follow-up in the homeless group. The homeless group displayed many pre-morbid and baseline socio-demographic and clinical characteristics associated with poor psychosis outcomes, some of which were replicated in the present study: non-affective psychosis (versus affective psychosis), SUD and lower education level (Malla and Payne, 2005) (Abdel-Baki et al., 2017) (Harrison et al., 2001; Schubert et al., 2015). Moreover, homelessness could worsen outcomes in different ways. For instance, it could lead to or perpetuate SUD (Martijn and Sharpe, 2006) (Babidge et al., 2001), judicialization (Gaetz et al., 2016), victimization (Gaetz et al., 2016) and mental health

problems (Gaetz et al., 2016). Furthermore, homelessness is linked with excessive stress, since even basic needs (food, place to sleep, security) are not met (Gaetz et al., 2016) (Fournier et al., 2001) and require constant problem-solving strategies, known to be affected in psychotic disorders (Bilder et al., 2000). As proposed by the vulnerability stress diathesis model, such exposure to high stress levels can trigger and maintain psychotic symptoms in vulnerable individuals (Zubin and Spring, 1977).

4.5. Service utilization

The homeless group had more psychiatric hospital admissions and spent more days in hospital, which confirmed previous findings (Folsom et al., 2005). It could be explained, in part, by greater illness severity as suggested by a trend in higher PANSS scores, by high prevalence of SUD comorbidities (e.g., symptoms or psychotic relapse induced by intoxication or withdrawal), because of waiting in hospital to obtain appropriate supervised housing or because of mental health deterioration associated with poor outpatient follow-up, or stressful life conditions. Indeed, it may be harder for the homeless to attend appointments, as they present more cognitive deficits (Foster et al., 2012), SUD (Foster et al., 2012), legal issues (Foster et al., 2012), less social support (Bonin et al., 2007) and less financial means to afford transportation as well as their primary needs (consequently, they spend many hours every day trying to find meals and shelter).

4.6. Adherence

Most subjects in both groups adhered to prescribed medications, with no differences detected between groups, although lower adherence was previously described among the homeless (Bickley et al., 2006) and among ISMI patients (Velligan et al., 2009). It is possible that EIS (compared to regular services) and Canada's universal and free healthcare system (including medication insurance coverage) might have made treatment adherence easier. Furthermore, the present study defined adherence to medication as "taking the prescribed medication regularly and timely, more than 90% of doses" whatever the means needed to attain adherence, whether voluntary or not. However, the homeless group had more community treatment orders and more LAI antipsychotics, which increased adherence but may not reflect patients' choices, responsibilities and executive function capacities to obtain medication, nor their insight into their illness and need for treatments.

4.7. Strengths

This study gives a good overall portrait of FEP patients with a history of homelessness, in terms of baseline socio-demographics, symptomatology, functioning, treatment and service utilization. To our knowledge, it is the first study to describe homelessness evolution longitudinally in a cohort of young FEP adults, which includes almost all incident FEP cases in a defined catchment area, since citizens in Quebec province are treated by the mental health system of their catchment area, free and with equal accessibility. Moreover, subjects who declined to participate or were not apt to consent to the research protocol were included in the present study, while they were generally excluded from previous reports. This led to a sample quasi-representative of the whole FEP population. The broad definition of homelessness adopted as well as the description of its duration and evolution delivers a good portrait of the real prevalence of this phenomenon in a Canadian inner city metropolis. Homelessness data were collected in a longitudinal manner, prospectively and retrospectively, not limited to self-reporting, which allowed more cases to be identified.

4.8. Limitations

Because homelessness was collected in part retrospectively, cases of homelessness might have been missed or homelessness duration underestimated, especially when homelessness occurred prior to admission, since collateral information from family was sparse, and recall was sometimes difficult for patients. However, these possible cases would probably have displayed shorter periods of homelessness, impacting outcome to a lesser extent.

Although outcome assessment scales GAF and SOFAS are fast, global, objective and valid across diagnosis, they are less sensitive to small changes or to changes on only 1 outcome dimension and drastically influenced by certain aspects. For example, psychotic symptoms lead to GAF score under 40, and homelessness, to GAF or SOFAS scores under 30. Therefore, although psychosis is in remission, if patients are still homeless, their GAF score could not be higher than 30, not mirroring clinical improvement. Moreover, GAF does not permit differentiation between clinical and functional outcomes, and is influenced by the worst of both outcomes, giving pessimistic scores. This is why SOFAS scale was also considered (as it is not influenced by symptoms).

Outpatient appointments and attendance rates were not measured, which does not allow between-group comparison of outpatient services provided, neither of general follow-up intensity.

Although oral medication adherence was evaluated considering many sources of information (interview, chart review (including family's, case manager's and doctor's reports) and blood medication levels, when available), it could be overestimated since it lacked systematic, objective and validated measures (e.g., pill counts) and was only assessed annually. Mortality could have occurred in the LTF group, without the treatment team being informed. Completion of data collection with other sources such as national registries could have avoided possible missing data.

Some known confounding variables, associated with poorer outcome in previous FEP studies, were not collected, e.g., duration of untreated psychosis, percentage of time spent experiencing psychotic symptoms during follow-up, and cognitive deficits (Malla and Payne, 2005) (Harrison et al., 2001).

Although duration of follow-up was interesting and similar to that in other FEP studies, and even though it has been observed that FEP early outcomes predict long-term outcomes (Harrison et al., 2001), extending such investigation to the entire early psychosis "critical period" of 5 years (Birchwood et al., 1998) would be relevant. Indeed, some changes on outcomes measures may need a longer observation period to occur, particularly in this group, since they might be struggling, at the beginning of treatment, with transitions out of homelessness. This situation is associated with a great deal of stress, which might impact short-term outcomes. Thus, improvement may be delayed, and it is possible that long-term prognosis could mend further, once housing is stabilized over a longer time period.

Moreover, type β errors were more likely, as some comparisons were made between restricted groups, on variables with large standard deviations, resulting in low statistical power and possibly impairing detection of true differences between groups (e.g., emergency room visits (0.70 versus 0.47, $p = 0.053$). The Bonferroni correction (significance level of $\alpha \leq 0.002$ instead of 0.05) applied for multiple tests, although minimizing the probability of α type error, might have induced type II errors (false negative), eg. the 2-year total PANSS score, which is more than 10 points higher in the homeless but failed to meet significance level (with $p = 0.003$).

Finally, this study was carried out in an observational aim, to explore the differences between the homeless young adults with FEP and their never homeless peers. Therefore, the design of the present study does not allow to determine any causality link or direction between homelessness and any other factor or outcome.

Nevertheless, our results suggest that homelessness could be considered as a psychosocial indicator of a particularly vulnerable subgroup of FEP with more severe difficulties (including childhood trauma and premorbid lower functioning) before and during the 2 years treatment, that persists despite regular early intervention for psychosis. This might underline the need for some special attention or some specific psychosocial interventions for that subgroup with more comorbidities and worse clinical and psychosocial outcomes.

5. Conclusion

Homeless FEP patients represent one of the most vulnerable groups in society. Despite EIS intensity, similar rates of clozapine treatment, higher rates of LAI antipsychotics and community treatment orders (which lead to similar treatment adherence), patients with homelessness history have worse 2-year clinical and functional outcomes and worse QLS than housed FEP.

As some interventions among homeless ISMI patients have achieved promising results (Herman et al., 2011), homeless young adults with FEP would probably benefit from specialized intensive services to meet their specific needs, such as residential stabilization (with specific housing support), integrated SUD interventions, rehabilitation addressing financial management, social support and occupational activities paired with progressive integration into the community (Doré-Gauthier et al., 2019; Doré-Gauthier et al., 2019). Also, active outreach is required to build therapeutic alliance and help them navigate the healthcare system, including attending appointments.

More studies are warranted among young FEP adults experiencing homelessness, to evaluate whether adapting services to their needs, would improve their long-term clinical and functional outcomes, considering that the first five years of illness constitute a critical period.

Contributors

Drs Amal Abdel-Baki and Isabelle Sarah Lévesque designed the study, contributed to recruitment and data collection and interpreted the data.

Under Dr Abdel-Baki's supervision, Dr Isabelle Sarah Lévesque managed the literature searches, undertook the statistical analysis and wrote the final manuscript.

Dr Abdel-Baki, as the principal investigator and the research director, overviews all the steps and the research staff.

Funding source

We do not have any funding source.

Declaration of competing interest

The authors have no conflicts of interest to declare.

Acknowledgements:

We thank the research assistant Mr Pat Bauco who interviewed the youths and collected the data necessary for our analysis. We also thank all the youths who accepted to participate and every member of the Clinique JAP team who contributed to this study.

References

Abdel-Baki, A., Ouellet-Plamondon, C., Salvat, É., Grar, K., Potvin, S., 2017. Symptomatic and functional outcomes of substance use disorder persistence 2 years after admission to a first-episode psychosis program. Psychiatry Res. 247, 113–119.

Albert, N., Melau, M., Jensen, H., Emborg, C., Jepsen, J.R., Fagerlund, B., Gluud, C., Mors, O., Hjorthøj, C., Nordentoft, M., 2017. Five years of specialised early intervention versus two years of specialised early intervention followed by three years of standard treatment for patients with a first episode psychosis: randomised, superiority, parallel group trial in Denmark (OPUS II). BMJ 356, i6681.

Babidge, N.C., Buhrich, N., Butler, T., 2001. Mortality among homeless people with schizophrenia in Sydney, Australia: a 10-year follow-up. Acta Psychiatr. Scand. 103 (2), 105–110.

Barnes, T.R., Hutton, S.B., Chapman, M.J., Mutsatsa, S., Puri, B.K., Joyce, E.M., 2000. West London first-episode study of schizophrenia. Clinical correlates of duration of untreated psychosis. Br. J. Psychiatry 177, 207–211.

Bertelsen, M., Jeppesen, P., Petersen, L., Thorup, A., Øhlenschlaeger, J., le Quach, P., Christensen, T., Krarup, G., Jørgensen, P., Nordentoft, M., 2008. Five-year follow-up of a randomized multicenter trial of intensive early intervention vs standard treatment for patients with a first episode of psychotic illness: the OPUS trial. Arch. Gen. Psychiatr. 65 (7), 762–771.

Bickley, H., Kapur, N., Hunt, I.M., Robinson, J., Meehan, J., Parsons, R., McCann, K., Flynn, S., Burns, J., Amos, T., Shaw, J., Appleby, L., 2006. Suicide in the homeless within 12 months of contact with mental health services : a national clinical survey in the UK. Soc. Psychiatry Psychiatr. Epidemiol. 41 (9), 686–691.

Bilder, R.M., Goldman, R.S., Robinson, D., Reiter, G., Bell, L., Bates, J.A., Pappadopulos, E., Willson, D.F., Alvir, J.M., Woerner, M.G., Geisler, S., Kane, J.M., Lieberman, J.A., 2000. Neuropsychology of first-episode schizophrenia: initial characterization and clinical correlates. Am. J. Psychiatry 157 (4), 549–559.

Birchwood, M., Todd, P., Jackson, C., 1998. Early intervention in psychosis. The critical period hypothesis. Br. J. Psychiatr. Suppl. 172 (33), 53–59.

Bonin, J.P., Fournier, L., Blais, R., 2007. Predictors of mental health service utilization by people using resources for homeless people in Canada. Psychiatr. Serv. 58 (7), 936–941.

Bonin, J.P., Fournier, L., Blais, R., 2009. A typology of mentally disordered users of resources for homeless people: towards better planning of mental health services. Adm. Policy Ment. Health 36 (4), 223–235.

Caton, C.L., 1995. Mental health service use among homeless and never-homeless men with schizophrenia. Psychiatr. Serv. 46 (11), 1139–1143.

Caton, C.L., Shrout, P.E., Dominguez, B., Eagle, P.F., Opler, L.A., Cournos, F., 1995. Risk factors for homelessness among women with schizophrenia. Am. J. Public Health 85 (8 Pt 1), 1153–1156.

Caton, C.L., Shrout, P.E., Eagle, P.F., Opler, L.A., Felix, A., Dominguez, B., 1994. Risk factors for homelessness among schizophrenic men: a case-control study. Am. J. Public Health 84 (2), 265–270.

Doré-Gauthier, V., Côté, H., Jutras Aswad, D., Ouellet-Plamondon, C., Abdel-Baki, A., 2019. How to help homeless youth suffering from first episode psychosis and substance use disorders? The creation of a new intensive outreach intervention team. Psychiatry Research 273, 603–612. https://doi.org/10.1016/j.psychres.2019.01.076.

Drake, R.E., Caton, C.L., Xie, H., Hsu, E., Gorroochurn, P., Samet, S., Hasin, D.S., 2011. A prospective 2-year study of emergency department patients with early-phase primary psychosis or substance-induced psychosis. Am. J. Psychiatry 168 (7), 742–748.

Fazel, S., Khosla, V., Doll, H., Geddes, J., 2008. The prevalence of mental disorders among the homeless in western countries: systematic review and meta-regression analysis. PLoS Med. 5 (12), e225.

Folsom, D., Jeste, D.V., 2002. Schizophrenia in homeless persons: a systematic review of the literature. Acta Psychiatr. Scand. 105 (6), 404–413.

Folsom, D.P., Hawthorne, W., Lindamer, L., Gilmer, T., Bailey, A., Golshan, S., Garcia, P., Unützer, J., Hough, R., Jeste, D.V., 2005. Prevalence and risk factors for homelessness and utilization of mental health services among 10,340 patients with serious mental illness in a large public mental health system. Am. J. Psychiatry 162 (2), 370–376.

Foster, A., Gable, J., Buckley, J., 2012. Homelessness in schizophrenia. Psychiatr. Clin. N. Am. 35 (3), 717–734.

Fournier, L., Chevalier, S., Bonin, J.-P., 2001. Enquête auprès de la clientèle des ressources pour personnes itinérantes des régions de Montréal-Centre et de Québec. Quebec. Institut de la statistique du Québec, Collection Santé et bien-être, p. 131.

Gaetz, S., Barr, C., Friesen, A., Harris, B., Hill, C., Kovacs-Burns, K., Pauly, B., Pearce, B., Turner, A., Marsolais, A., 2012. Canadian Definition of Homelessness. Canadian Observatory on Homelessness Press, Toronto.

Gaetz, S., O'Grady, B., Kidd, S., Schwan, K., 2016. Without a Home: the National Youth Homelessness Survey. Canadian Observatory on Homelessness Press, Toronto.

Harrison, G., Hopper, K., Craig, T., Laska, E., Siegel, C., Wanderling, J., Dube, K.C., Ganev, K., Giel, R., an der Heiden, W., Holmberg, S.K., Janca, A., Lee, P.W., León, C.A., Malhotra, S., Marsella, A.J., Nakane, Y., Sartorius, N., Shen, Y., Skoda, C., Thara, R., Tsirkin, S.J., Varma, V.K., Walsh, D., Wiersma, D., 2001. Recovery from psychotic illness: a 15- and 25-year international follow-up study. Br. J. Psychiatry 178, 506–517.

Harrison, G., Mason, P., Glazebrook, C., Medley, I., Croudace, T., Docherty, S., 1994. Residence of incident cohort of psychotic patients after 13 years of follow up. BMJ 308 (6932), 813–816.

Herman, D.B., Conover, S., Gorroochurn, P., Hinterland, K., Hoepner, L., Susser, E.S., 2011. Randomized trial of critical time intervention to prevent homelessness after hospital discharge. Psychiatr. Serv. 62 (7), 713–719.

Herman, D.B., Susser, E.S., Jandorf, L., Lavelle, J., Bromet, E.J., 1998. Homelessness among individuals with psychotic disorders hospitalized for the first time: findings from the Suffolk County Mental Health Project. Am. J. Psychiatry 155

(1), 109–113.
Malla, A., Lal, S., Vracotas, N.C., Goldberg, K., Joober, R., 2010. Early intervention in psychosis: specialized intervention and early case identification. Encephale 36 (Suppl. 3), S38–S45.
Malla, A., Payne, J., 2005. First-episode psychosis: psychopathology, quality of life, and functional outcome. Schizophr. Bull. 31 (3), 650–671.
Martijn, C., Sharpe, L., 2006. Pathways to youth homelessness. Soc. Sci. Med. 62 (1), 1–12.
Morrison, D.S., 2009. Homelessness as an independent risk factor for mortality: results from a retrospective cohort study. Int. J. Epidemiol. 38 (3), 877–883.
Mortensen, P.B., Juel, K., 1990. Mortality and causes of death in schizophrenic patients in Denmark. Acta Psychiatr. Scand. 81 (4), 372–377.
Network, C.H.R., 2012. Définition canadienne de l'itinérance. Homeless Hub. www.homelesshub.ca/CHRNhomelessdefinition/.
Nordentoft, M., Madsen, T., Fedyszyn, I., 2015. Suicidal behavior and mortality in first-episode psychosis. J. Nerv. Ment. Dis. 203 (5), 387–392.
Odell, S.M., Commander, M.J., 2000. Risks factors for homelessness among people with psychotic disorders. Soc. Psychiatry Psychiatr. Epidemiol. 35 (9), 396–401.
Ouellet-Plamondon, C., Rousseau, C., Nicole, L., Abdel-Baki, A., 2015. Engaging immigrants in early psychosis treatment: a clinical challenge. Psychiatr. Serv. 66 (7), 757–759.
Perälä, J., Suvisaari, J., Saarni, S.I., Kuoppasalmi, K., Isometsä, E., Pirkola, S., Partonen, T., Tuulio-Henriksson, A., Hintikka, J., Kieseppä, T., Härkänen, T., Koskinen, S., Lönnqvist, J., 2007. Lifetime prevalence of psychotic and bipolar I disorders in a general population. Arch. Gen. Psychiatr. 64 (1), 19–28.
Petersen, L., Nordentoft, M., Jeppesen, P., Ohlenschaeger, J., Thorup, A., Christensen, T., Krarup, G., Dahlstrøm, J., Haastrup, B., Jørgensen, P., 2005. Improving 1-year outcome in first-episode psychosis: OPUS trial. Br. J. Psychiatr. Suppl. 48, s98–s103.
Ran, M.S., Chan, C.L., Chen, E.Y., Xiang, M.Z., Caine, E.D., Conwell, Y., 2006. Homelessness among patients with schizophrenia in rural China: a 10-year cohort study. Acta Psychiatr. Scand. 114 (2), 118–123.
Roy, M.A., Lanctôt, G., Mérette, C., Cliche, D., Fournier, J.P., Boutin, P., Rodrigue, C., Charron, L., Turgeon, M., Hamel, M., Montgrain, N., Nicole, L., Pirès, A., Wallot, H., Ponton, A.M., Garneau, Y., Dion, C., Lavallée, J.C., Potvin, A., Szatmari, P., Maziade, M., 1997. Clinical and methodological factors related to reliability of the best-estimate diagnostic procedure. Am. J. Psychiatry 154 (12), 1726–1733.
Schubert, K.O., Clark, S.R., Baune, B.T., 2015. The use of clinical and biological characteristics to predict outcome following First Episode Psychosis. Aust. N. Z. J. Psychiatr. 49 (1), 24–35.
Scott, J., 1993. Homelessness and mental illness. Br. J. Psychiatry 162, 314–324.
Stephen Gaetz, B.O.G., Kidd, Sean, Schwan, Kaitlin, 2016. Without a Home: the National Youth Homelessness Survey. Canadian Observatory on Homelessness Press, Toronto.
Tulloch, A.D., Fearon, P., David, A.S., 2012. Timing, prevalence, determinants and outcomes of homelessness among patients admitted to acute psychiatric wards. Soc. Psychiatry Psychiatr. Epidemiol. 47 (7), 1181–1191.
Vazquez, C., Muñoz, M., Crespo, M., et al., 2005. A comparative Study of the 12-Months Prevalence of physical health problems among homeless people in Madrid and Washington, DC. Int. J. Ment. Health 34 (3), 35–36.
Velligan, D.I., Weiden, P.J., Sajatovic, M., Scott, J., Carpenter, D., Ross, R., Docherty, J.P., E.C. P.o.A.P.i.S.a.P.M. Illness, 2009. The expert consensus guideline series: adherence problems in patients with serious and persistent mental illness. J. Clin. Psychiatry 70 (Suppl. 4), 1–46 quiz 47-48.
Zubin, J., Spring, B., 1977. Vulnerability–a new view of schizophrenia. J. Abnorm. Psychol. 86 (2), 103–126.
Doré-Gauthier V, Miron JP, Jutras Aswad D, Ouellet-Plamondon C, Abdel-Baki A. (2019) Specialized assertive community treatment intervention for homeless youth with first episode psychosis and substance use disorder: A 2 year follow-up study. *Early Intervention in Psychiatry.*2019 Jul 5. doi: 10.1111/eip.12846.