

Review article

Schizophrenia in homeless persons: a systematic review of the literature

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Objective: This article systematically reviews studies of prevalence of schizophrenia in homeless persons.

Method: Medline and PsychInfo were searched using the key words: homeless person, mental illness, psychosis, and schizophrenia. The bibliographies of identified articles were also reviewed.

Results: Study designs varied considerably. The rate of schizophrenia in homeless persons reported in the 33 published reports, representing eight different countries, ranged from 2 to 45%. In the 10 methodologically superior studies, the prevalence range was 4–16% and the weighted average prevalence was 11%. In addition, rates were higher in younger persons, women and the chronically homeless. Slightly less than half of the homeless persons with schizophrenia were not currently receiving treatment.

Conclusion: Schizophrenia is much more prevalent among homeless persons than in the population at large. Future research should focus on better ways of meeting the mental health care needs of homeless people with schizophrenia.

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Key words: antipsychotic agents; homeless persons; psychotic disorders; schizophrenia

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Introduction

The plight of homelessness among people with mental illnesses has been a growing concern for the past two decades (1, 2). During the 1980s, this concern increased along with the dramatic rise in the number of homeless persons in the United States (3, 4). As the number of homeless persons increased, the public's perception of who is homeless also changed. The 'typical' homeless person was no longer an older single white alcoholic male (5). Instead, a psychotic and disheveled person became the prototypical homeless individual (2, 6). There has been a series of research studies attempted to document the prevalence rates of schizophrenia and other psychiatric illnesses in homeless persons. But still, homeless people are '...a minority neglected by medicine in general and psychiatry in particular' (7).

It is a commonly held belief among the lay public and many psychiatrists that people with schizophrenia make up a large minority of the homeless population (8). For example, one standard US textbook on psychiatry states 'patients with a diagnosis of schizophrenia are

reported to account for 33–50% of homeless Americans' (9). Starting in the 1980s, a series of well carried out studies have documented the prevalence of schizophrenia and other mental illnesses in homeless persons. These investigations have utilized representative samples and standardized diagnostic measures to estimate the prevalence rates of psychiatric illnesses in homeless persons.

The causes of homelessness among people with schizophrenia and other mental illnesses continue to be debated. Deinstitutionalization, a failure of the community mental health care system to meet their needs, and economic forces have been cited as contributing to homelessness among persons with schizophrenia (1, 2, 10). Although the causes are debatable, few would dispute that homelessness has a large negative impact on the quality of life in people with schizophrenia. The mortality rates for homeless people with schizophrenia are four times that of the general population (11) and more than twice that of people with schizophrenia who are not homeless (12, 13). In addition, once homeless, access to medical and psychiatric treatment is much more difficult (14, 15).

An accurate assessment of the prevalence of schizophrenia in homeless persons is important for designing interventions and treatment systems aimed at helping homeless people with schizophrenia (14, 16). There have been several reviews of mental illness in homeless people (17–19). To our knowledge, there have been no prior reviews of this literature focused on schizophrenia in homeless persons. In this systematic review, we sought to calculate an estimate of the prevalence of schizophrenia in homeless persons, as well as draw other conclusions regarding schizophrenia in people who are homeless.

Material and methods

A computerized search of the literature published after 1966 (earliest possible Medline citation) was conducted on Medline and PsychInfo using the key-words *homeless persons*, *mental illness*, *psychosis*, and *schizophrenia*. Bibliographies of identified articles were also reviewed. This overview was limited to English language articles that quantified the prevalence of psychosis or schizophrenia in a specified group of homeless persons, either by direct interview or by use of previously collected diagnostic data. Articles that employed only 'expert' estimates, or reported numbers based only on surveys of 'key informants', such as shelter operators, were excluded. Similarly, reports that assessed rates of mental illness in homeless persons presenting to psychiatric emergency rooms or on inpatient psychiatric wards were excluded, as were investigations limited to women in shelters for battered women. When two or more articles included the same data set, only the original article was used. The definition of homelessness used for this overview included persons in missions, shelters, living on the street or in hostels. Studies restricted to people living in board-and-care facilities were excluded (although investigations that had board-and-care facilities as one of the sites were included).

A total of 33 articles were identified. Each article was then systematically reviewed for the following information: city where the study was conducted, number of subjects, mean age, gender and ethnic distribution, instruments employed to make the psychiatric diagnosis, percentage of homeless persons with schizophrenia or psychosis, method used to obtain the interviewed sample, and other descriptive information specific to the people with schizophrenia.

To calculate an estimate of the prevalence of schizophrenia in homeless persons, we used the 10 investigations that utilized a standardized

diagnostic measure and had a representative sample. These 10 studies resulted in 11 published reports; one study utilized the same diagnostic and sampling methodology for both men and women, but reported the results in two separate articles (20, 21). In this review, the prevalence rates from these two reports are combined and treated as a single study. Because the method used to obtain the sample and make the diagnosis were variable, it was not possible to perform a meta-analysis of these investigations. Instead, a weighted mean (by sample size) was calculated for these 10 studies. The other statistical comparison made in this review was a comparison of the prevalence rates of schizophrenia in homeless men and women. We considered the six investigations (seven reports) which reported prevalence rates for men and women separately (6, 14, 20–24). For each of these studies, a ratio was calculated by dividing the prevalence rate of schizophrenia among the women by that in the men. An overall ratio was then obtained by calculating the average of these six ratios.

Results

Twenty-eight of the studies gave prevalence rates of schizophrenia, while five evaluated only the presence of psychotic symptoms (15, 25–28). A summary of the reviewed articles is presented in Table 1, which groups the studies based on whether a representative sample was obtained and whether a standardized diagnostic tool was used.

Methodological aspects

The definition of a homeless person varied across these studies. The Brazilian study had the most restrictive criteria: 'spending 24 h a day on the street...living on the street for the last 12 months' (29). Most investigators considered a person currently sleeping in a shelter or on the street to be homeless. A more liberal definition was 'spending one or more nights on the street or in a shelter in the past 30 days' (27). Finally, several of the studies evaluated persons living in hostels and one investigation included people living in board-and-care facilities as well as shelters and on the street (6). (As mentioned above, however, we excluded studies restricted to board-and-care facilities only.)

The study locations also varied greatly. Although most researchers included samples from downtown urban sites, several other locations were also included. In one report from Baltimore, jails

Table 1. Studies of schizophrenia in homeless persons

S. no.	Study	Location	n	Age (mean)	Gender, % M	Ethnicity	Diagnostic tool	Percentage with schizophrenia	Sample	Comments
A. Studies with standardized diagnostic instrument and a representative sample										
1	Koegel et al. 1988 (3)	Skid row in Los Angeles	379	N/A	95%	31% W 45%B 14% H	Diagnostic Interview Schedule (DIS)	13.1%	Representative sampling of homeless people in the shelters, missions and soup kitchens of skid row. Homeless on the street were not sampled.	Rate of schizophrenia by Age-18-30, 13%; 31-40 21%; 41-69, 8% Length of homelessness: Long-term 18%, cyclic 13%, newly homeless 2%
2	Venez et al. 1988 (31)	Three countries in California: Orange, Yolo, and Alameda	315	N/A	62%	47% W 34%B 7%H	Shortened version of the DIS-`key items highly likely to be predictive of the diagnosis"	Overall 11% Alameda 16% Orange 7% Yolo 11%	Sampled people in shelters and street. Representative sample	
3	Breakay et al. 1989 (14)	Baltimore jails, missions and shelters	203	40	62%	37% W 63% other	Standardized psychiatric exam by psychiatrist	14%	Random sample from a total of 20 sampling sites, including all missions and shelters in Baltimore.	Rate of schizophrenia by gender: male 12%, female 17%
4	Herrman et al. 1989 (6)	Melbourne, Australia	382	N/A	82%	N/A	Modules of the SCID-R	15% lifetime 14% current (for shelters) an additional 6% with other psychotic disorders	Randomly chosen residents of shelters, board and care facilities and boarding homes. All shelters in Melbourne were sampled	Rate of psychosis by gender: male 8%, female 35%
5	North & Smith 1992 (23)	St Louis	900	M 36	67%	For men: 26% W 70%B For Women: 12%W 84%B	DIS/HS (Diagnostic interview for diagnosis/homeless supplement)	5%	Randomly chosen residents from 25 of the 27 shelters in St. Louis. Also representative sample of homeless men on street	Rate of schizophrenia by gender male 6% female 4% In prior 1 year: 31% received treatment35% sought, but unable to receive treatment
6	Fichter 1996 (21)	Munich, Germany	146	43	100%	N/A	DIS	12.4%	Random sampling of men in shelters, soup kitchen and on the street	
7	Greifenhagen & Fichter 1997 (20)	Munich, Germany	32	35	0%	N/A	DIS	34%	Random sampling of women in shelters, soup kitchens and on the street. Women in shelters for battered women were not included.	
8	Vazquez 1997 (24)	Madrid	262	N/A	79%	N/A	CIDI	2.4% 1 year 4.5% lifetime	Randomly chosen persons at two shelters, two soup kitchens, and one case management center. Street sample chosen using list from mobile outreach team.	Rate of schizophrenia by gender: male 4%, female 5%
9	Heckert et al. 1999 (29)	Juiz de Fora,	83	40	85%	36% black	SCAN Brazil (Schedule for clinical assessment in psychiatry)	9.6%	Persons who were over 18 and homeless >1 year. The following sites were sampled: outdoor areas, religious institutions, public institutions, and hospitals for the homeless.	None of those with a diagnosis of schizophrenia had alcohol dependence. Duration of homelessness longer in people with schizophrenia than rest of sample.

Table 1. (Continued)

S. no.	Study	Location	n	Age (mean)	Gender, % M	Ethnicity	Diagnostic tool	Percentage with schizophrenia	Sample	Comments
10	Kovess & Lazarus 1999 (34)	Paris	838	N/A	85%	59% French 26% African 10% other	CIDI	16% lifetime 6% 1 year	Random sampling of all homeless shelters and kitchens in Paris	An additional 9% had uncertain diagnosis of schizophrenia. For persons with schizophrenia, in the past 12 months: 64% saw a medical doctor, 41% a psychiatrist and 68% took a psychotropic medication.
11	Fichter et al. 2001 (7)	Munich, Germany	265	45	100%	N/A	SCID-IV administered by physicians or clinical psychologists	4.4%, with an additional 4.5% diagnosed with psychosis NOS	Homeless persons were randomly sampled in three sectors, shelters (n = 158), meal lines (n = 95) and outdoors (n = 12).	
B. Studies with a representative samples but without a standardized diagnostic instrument										
12	Culhane et al. 1998 (22)	Philadelphia	27638	N/A	16 201M 11 437F	N/A	Clinical diagnosis from computerized treatment records	6.3%	All homeless persons who entered one of the public homeless shelters in Philadelphia from 1990-92	Rates of schizophrenia: Age: 18-30 4%, 31-45 7%, >45 9% Gender: male 6.7%, female 10.8%
C. Studies without a representative sample										
13	Freeman et al. 1979 (5)	Single mission in Toronto's skid row	60	52	100%	N/A	Present State Exam	20%	Randomly selected residents of a single shelter	9 of the 12 patients with schizophrenia had prior psychiatric treatment and 8 had prior hospitalization.
14	Arce et al. 1983 (46)	Philadelphia emergency	179	N/A	78%	46% W 50% B 3% H	Clinical DSMIII diagnosis, unclear who made diagnosis	37%	179 of the 193 persons admitted to the emergency winter shelter	
15	Bassuk et al. 1984 (2)	Boston shelter	78	34	83%	77% W 22% B	Interviews performed by psychiatrists, psychologists and social workers.	36%	Persons staying at a single shelter in Boston- the shelter sampled was chosen as a 'representative shelter'.	Only 4 of the 30 psychotic residents were receiving treatment
16	Doutney et al. 1985 (32)	Shelter in Sidney	91	N/A	100%	N/A	Structured interview by a psychiatrist and review psychiatric records.	14%	Randomly chosen residents of a single hostel in Sidney	
17	Fischer et al. 1986 (40)	Mission users in downtown Baltimore	51	N/A	94%	53% W 47% other	DIS	2%	1/5 of the population at each of 4 missions	
18	Sacks et al. 1987 (43)	Fresno, California	61	N/A	67%	N/A	PDI (Psychiatric Diagnostic Interview)	10%, 16% with psychosis	Random selection of residents from 3 shelters	70% of those with a psychotic disorder had prior psychiatric treatment (need to confirm this)
19	Susser et al. 1989 (42)	Shelters in New York City first time shelter users	177	N/A	100%	22% W 53% B 18% H	SCID-PD	10% (17% had definite or probable psychosis)	All first time users of the New York City public shelter system during the spring and summer of 1985.	Psychosis by: Age 17-29: 21%, 30-39: 13% and > 40: 14%. Length of homelessness: chronic 27%, newly homeless 14%

Table 1. (Continued)

S. no.	Study	Location	n	Age (mean)	Gender, % M	Ethnicity	Percentage with schizophrenia	Diagnostic tool	Sample	Comments
20	Timms 1989 (39)	Salvation Army Hostel in London	124	50	100%	88% W 12% B	33%	Semi-structured interview, unknown interviewer	Unclear sampling method. 58 persons who had lived in the hostel for >1 year and 65 new arrivals.	66% of those persons diagnosed with schizophrenia were not receiving any treatment. The rate of schizophrenia was 25% in the new arrivals and 37% in the long term residents
21	Toro and Wall 1991 (41)	Buffalo, NY	76	33	79%	63% W	1%	DIS	Single shelter- randomly chosen residents. Single soup kitchen- sampled new users. Street sample All women enrolled in a VA homeless outreach program	
22	Leda et al. 1992 (47)	45 VA sites for homeless chronically mentally ill veterans	310	N/A	0%	51% W	17%	Diagnosis based on clinical evaluation by a social worker or RN.	All women admitted during a 3-month period and all women who had been in the hostel for more than 6 months at the time the study started.	
23	Marshall & Reed 1992 (36)	2 hostels in inner city London	70	52	0%	N/A	45%	Semi-structured interview with clinical diagnosis based on DSM III-R	All women admitted during a 3-month period and all women who had been in the hostel for more than 6 months at the time the study started.	
24	Acorn 1993 (33)	7 shelters in downtown Vancouver	124	32	71%	83% W 11% Native American 5% H	10%	Semi-structured interview by lay interviewer	Residents in 7 shelters in the downtown area. Unknown how each subject was chosen to be interviewed	Diagnosis of schizophrenia was made by history of schizophrenia, rather than based on current symptoms.
25	Adams et al. 1996 (35)	A 60 bed direct access hostel in London serving only women	64	44	18-82	70% W 25% B	27%	Psychosis portion of SCID given to those suspected of "severe mental illness"	Single hostel, method of sampling not described	
26	Geddes et al. 1996 (37)	Edinburgh, Scotland hostels	136	N/A	90%	N/A	10%	Present State Exam and review of medical records	"Random sample" of 9 hostels. Not described how the random sample was derived or how each person was chosen	4/13 of the sample with schizophrenia were not receiving treatment, and 3/13 were alcohol dependent. Persons with schizophrenia had the highest levels of Disability.
27	Haugland et al. 1997 (30)	Westchester County, NY a suburban setting	201	37	89%	26% W 65% B 7% H	10%	Clinical diagnosis based on past psychiatric history and clinical interview.	Consecutive single persons who presented to social service agency seeking help with shelter.	
28	Sciare 1997 (38)	Single hostel in Aberdeen, Scotland	75	34	85%	100% W	5%	Interview by psychiatrist using PSE and review of local hospital admissions.	Persons who slept the previous night in one of 10 randomly chosen beds in a single hostel.	
D. Studies that report rates of psychosis										
29	Gelberg et al. 1990 (15)	Beach area of Los Angeles	521	34	N/A	64% W 24% B 7% H	40% with psychotic symptoms.	Series of 6 psychotic symptom questions, taken from DIS	Sample taken from 19 sites where homeless congregated including shelters, food lines and outdoor areas.	Psychosis rate by age: 18-49 40%, 50-78 25%

Table 1. (Continued)

S. no.	Study	Location	n	Age (mean)	Gender, % M	Ethnicity	Diagnostic tool	Percentage with schizophrenia	Sample	Comments
30	Weller et al. 1989 (26)	London	319	49	N/A	N/A	Present State Exam	22% with psychosis	This was a compilation of 5 annual surveys. Each survey was done at a distinct site. Unclear who was interviewed at each site: 7 sites including shelters, meal centers, day centers and 24 street sites. Unknown method of sampling at each site.	
31	Mundy et al. 1990 (27)	Homeless teens in Hollywood, California	96	16	61%	59% W 15% B 13% H	HAS (Homeless Adolescent Interview Schedule), psychosis questions taken from DIS.	30% endorsed 4 or more psychotic symptoms	All women residing in one of 8 small shelters (<20 residents each) and every other woman in a 9 th shelter(85 residents).	
32	Kales et al. 1995 (25)	Rural shelters in Pennsylvania	81	M 41, F 33	71%	44% W 48% B	Psychosis was assessed using 5 questions from PERI with a cutoff score of 9	6.4% with psychosis.	Homeless persons over age 60. No discussion of how these persons were identified or whether an attempt was made to get a representative sample.	
33	Crane 1994 (28)	London	75	N/A	72%	N/A	Unknown interview and behavioral observation.	17% of men and 65% of women with psychosis		

CIDI: Composite International Diagnostic Interview; PERI: Psychiatric Epidemiologic Research Interview; SCID- Structured Clinical Interview for DSM-III-R, or IV; PSE: Present State Examination; DIS: Diagnostic Interview Schedule; BPRS: Brief Psychosis Rating Scale; PDI: Psychiatric Diagnostic Interview; N/A: (Data) Not Available; SMI: Severe Mental Illness; W: White; B: Black; H: Hispanic.

Prevalence

The prevalence rate of schizophrenia reported in these investigations ranged from 1 (41) to 45% (36). This range does not change appreciably when the studies that reported only the rates of psychosis

were sampled (14). One sample was from a suburban county in New York (30). Rural counties were part of one study from California (31) and comprised the entire sample in a Pennsylvania report (25). In addition to studies from the US, two were from Australia (6, 32), one from Brazil (29), two from Canada (5, 33), one from France (34), three from Germany (7, 20, 21), one from Spain (24) and seven from the UK (26, 28, 35–39). Five of the seven reports from the UK sampled hostels (35–39) as did one of the two Australian investigations (32).

The method each study used to sample homeless people also varied. The most rigorously designed investigations obtained representative samples of homeless persons by including every available shelter and soup kitchen in a given area, or randomly sampling a subset of these locations, and sampling homeless persons on the street. Persons within each site were then randomly selected for interviews (7, 15, 20, 21, 23, 24, 29, 31). Four studies used this same sampling method, but did not sample homeless persons on the street (3, 6, 14, 34).

The largest sample size was 27 836 people; however, this was a computerized database linkage study of all the public shelter users and people who received treatment in the public mental health system in Philadelphia over a 3-year period (22). Of the remaining investigations, 18 had over 100 people in their samples.

Methods used in diagnosing schizophrenia or psychosis also varied across the studies. The better-designed investigations utilized standardized diagnostic instruments such as the Diagnostic Interview Schedule (3, 20, 21, 23, 40, 41), Composite International Diagnostic Interview (24, 34), the Structured Clinical Interview for DSM-III-R (6, 42) or DSM-IV (7), the Psychiatric Diagnostic Interview (43), the Present State Examination (5, 37, 38), or a standardized examination by a psychiatrist (14, 32). Five studies reported rates of psychosis, rather than schizophrenia. The methods of assessment included psychosis questions taken from the Diagnostic Interview Schedule (15, 27), the Psychiatric Epidemiology Research Interview (25), or the Present State Examination (26). The remaining investigation did not specify the origin of its psychosis questions (28).

are included. Focusing on the 10 studies with representative samples and standardized diagnostic instruments (3, 6, 7, 14, 20, 21, 23, 24, 29, 31, 34), the reported prevalence of schizophrenia ranged from 4.4 (7) to 16% (34). Calculating a weighted (by sample size) average of these 10 studies produced a rate of 11%.

Other information related to homeless persons with schizophrenia

Age. Four studies examined the relationship between age and the prevalence rate of schizophrenia or psychosis in homeless persons (3, 15, 22, 42). Both of the studies from Los Angeles found the rates of schizophrenia and psychosis were highest in the younger homeless persons, and lower in older persons (3, 15). Koegel et al. reported a lifetime diagnosis of schizophrenia in 13% of homeless persons 18–30 years old, 21% in 31–40 years old, and 8% in 41–60 years old (3). Gelberg et al. noted 44% of the homeless persons aged 18–49 had psychotic symptoms, compared with 25% of those over 50 years old (15). A report from New York had similar findings, with a prevalence of 21% in 17–29 years old, 13% in 30–40 years old and 14% in those homeless persons over age 40 (42). In contrast, an investigation in Philadelphia found that older shelter users were more likely to be treated for schizophrenia than younger shelter users. Specifically, 4% of those aged 18–30 were treated for schizophrenia, compared with 7% aged 31–45 and 9% older than 45 (22). Because the Los Angeles and New York studies measured the prevalence of schizophrenia or psychotic symptoms, while the Philadelphia study reported treatment rates, it seems that older homeless persons have lower rates of schizophrenia.

Gender. Five investigations reported the prevalence of schizophrenia in men and women separately (6, 14, 22–24); one other study included both men and women, but reported the results in separate publications (20, 21). Only one study, from St Louis, found lower rates of schizophrenia in women (4% of women vs. 6% of men) (23). Another study from Madrid found similar rates of schizophrenia in women and men (24). The other four investigations found women had higher rates of schizophrenia. In Philadelphia, 11% of women received treatment for schizophrenia compared with 7% of men (22). In Baltimore, the rates of schizophrenia were 17% in women and 12% in men (14). The largest differences were seen in Munich where 34% of the women and 12% of the men were diagnosed with schizophrenia (20, 21) and Melbourne where the rates were 35% for women vs. 8% for men (6).

When the results of these five investigations were combined to obtain an overall ratio, schizophrenia was twice as common in homeless women as in homeless men.

Length of homelessness. The relationship between schizophrenia and duration of homelessness was reported in three studies (3, 29, 42). In Los Angeles, the prevalence of schizophrenia was highest in the long-term homeless, at 18%, compared with 13% of the cyclically homeless, and 2% of the newly homeless (3). Similar findings were found in New York, where the rate of psychosis was 27% in the chronically homeless compared with 14% in newly homeless persons (42). Although specific rates were not given, the Brazilian investigation reported that the duration of homelessness was longer in persons with schizophrenia than in the homeless sample as a whole (29). These results show that it is the chronically homeless, as opposed to the cyclically or newly homeless, who have the highest rates of schizophrenia.

Treatment. Treatment rates for homeless persons with schizophrenia were reported in five investigations. In Paris, the 1-year treatment rate for homeless people with schizophrenia was reported to be 68% (34). In St Louis, 31% of the homeless persons with schizophrenia received psychiatric treatment in the preceding 12 months. An additional 24% reported seeking treatment but were unable to obtain it, while 45% of the sample with schizophrenia did not seek treatment at all (23). The information on treatment rates in the three other studies is less specific. The Toronto and Edinburgh studies reported similar rates for lifetime psychiatric treatment of 82 (5) and 75% (37), respectively. A report from London noted that 66% of homeless people with schizophrenia were not receiving current treatment, but ‘current treatment’ was not defined (39). Clearly, not all homeless people with schizophrenia are untreated or refusing psychotropic medications. More than half received or sought treatment in the prior year and almost all received psychiatric treatment at some point in time. In addition, the findings from St Louis suggest there are significant barriers that keep homeless people with schizophrenia from accessing treatment (23).

Discussion

In view of the wide range of settings, sampling methods, and diagnostic tools used, as well as the fact that eight different countries were included, it is not surprising that the reported prevalence of

schizophrenia in homeless persons was variable. Nonetheless, although there were a few outliers, the best designed investigations found the prevalence of schizophrenia to be within a range of 4 (7) to 16% (34). The weighted average of the 10 best carried out studies was 11% (3, 6, 7, 14, 20, 21, 23, 24, 29, 31, 34). In addition to calculating an overall prevalence rate, several other conclusions can be made from these reports. Higher rates of schizophrenia were found in younger homeless people. Homeless women were approximately twice as likely to be diagnosed with schizophrenia as homeless men. The rates of schizophrenia were highest among chronically homeless people. Finally, between half and two-thirds of homeless people with schizophrenia either received or attempted to obtain treatment in the past 12 months.

The main finding of this systematic review is that approximately 11% of homeless persons meet the diagnostic criteria for schizophrenia. The ECA study reported the 1 year prevalence of schizophrenia in the housed population to be 1.0% and the life-time prevalence 1.4% (44). Thus, schizophrenia is seven to 10 times more common in homeless persons than in the housed population. Clearly, people with schizophrenia are much more vulnerable to becoming homeless than people with no mental illness. The fact that the highest rates of schizophrenia were found in the chronically homeless also suggests that many homeless people with schizophrenia have a very difficult time regaining stable housing.

Another finding of this review is that homeless women are approximately twice as likely to be diagnosed with schizophrenia as men. This higher rate of schizophrenia in homeless women is for single women. The relationship between homelessness and schizophrenia is different for women who have children in their custody. For example, in the Philadelphia study, the rate of schizophrenia among single homeless women was 10.8%, compared with 1.6% for homeless women with children in their custody (22). The only other report that specifically noted the parenting status of homeless women was from St Louis, where approximately 70% of the women had children in their custody (23). In the remaining three reports, no mention was made of children in the custody of the homeless women (6, 14, 20, 24). Overall, this suggests that homeless single women represent a group with a higher likelihood of schizophrenia.

This review found only two articles that provided specific information regarding the rates of psychiatric treatment for homeless people with schizophrenia. A recent editorial in *Acta Psychiatrica Scandinavica* considered 'aggressive treatment

of mental illness ... on the street and in homeless shelters' to be a cornerstone of meeting the needs of homeless persons (1). Yet, in St Louis, more than one-third of the homeless persons with schizophrenia who sought psychiatric treatment were unable to obtain it (23). Making treatment more available and easier to access would be an important step toward improving treatment rates and potentially reducing homelessness among people with schizophrenia.

One of the strengths of this review was the focus on homeless persons with schizophrenia. We were able to calculate a prevalence rate of schizophrenia in homeless people, draw conclusions regarding the effect of age and gender on the prevalence of schizophrenia, and to consider treatment rates for this disorder. In addition, this systematic review included investigations from several European nations, Australia, Canada, Brazil and the United States. We believe the conclusions of this review could be generalized to other Western countries and not limited to the United States. Limitations of this investigation include the heterogeneous design of the studies, which used a variety of diagnostic and sampling methods. In addition, several of the conclusions of this report were based on a small number of studies. Specifically, the differential rates of schizophrenia in homeless men and women were based on six investigations (6, 14, 20–24). Only two studies provided enough information regarding treatment rates to draw conclusions (23, 34). Finally, our estimate of the prevalence of schizophrenia in homeless people was 11%. This figure was calculated using a weighted mean, which can be oversensitive to studies with large numbers of subjects. We therefore recalculated the mean for these 10 studies, this time without weighting, and obtained a prevalence of 12%.

Successfully addressing the complex physical and mental health needs of homeless people with schizophrenia will require an interdisciplinary multilevel approach (7). This may be even more important in older homeless people with schizophrenia and comorbid medical illnesses (45). Future research should focus on designing programs that effectively meet the complex social, medical, psychiatric and economic needs of people with schizophrenia who become homeless.

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