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Three year course and outcome of mental illness in homeless men
A prospective longitudinal study based on a representative sample

■ **Abstract** *Objective* To report on the 3-year course and outcome of mental illness and social aspects in a representative sample of 265 homeless men living on the street or using overnight shelter. *Method* Expert interviews at baseline and at follow-up included the SCID-I and covered cognitive impairment, somatic complaints, use of medical services and psychosocial areas. Of 247 homeless men still alive, at 3-year follow-up, 185 (74.9 %) were successfully traced and interviewed face to face. *Results* There was considerable improvement regarding the housing situation after 3 years. Rates of mental illness decreased from 79 % to 66 % over 3 years possibly due to an improved housing situation and increased medical/psychiatric attention and service. The prevalence of mood disorders, substance use disorders and anxiety disorders was significantly lower at 3-year follow-up while psychotic disorders showed a slight increase over time. Thus, in general, more remission than incidence was observed in the 3-year follow-up period. A high rate of use of general medical inpatient services was found. Considering the very high prevalence of mental illness, the use of psychiatric services was very low with some increase over time. Mental health status at 1st assessment did not predict the housing situation at 3 year follow-up. Having had a substance use disorder diagnosis at 1st assessment was a powerful predictor of an unfavorable mental health status at 3 year follow-up. Standardized mortality ratio over 3 years was 4.4.

■ **Key words** mental illness · homelessness ·

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alcoholism · Structured Clinical Interview for DSM-IV (SCID) · psychiatric epidemiology · course of illness · longitudinal study

Introduction

Studies on the prevalence of mental illness in homeless individuals show rates which are much higher than in representative community samples (Koegel and Burnam 1988; Koegel et al. 1988; Burnam and Koegel 1988; Susser et al. 1995; Herrman et al. 1989; Fichter et al. 1996; Greifenhagen and Fichter 1997; Vázquez et al. 1997; Kovess and Lazarus 1999; Fichter and Quadflieg 2001).

Very little is known on the course of homelessness and the course of mental disorders in homeless individuals. Most studies report on samples which were treated medically or offered work therapy or some other measures for reintegration (e.g. Jones et al. 1994; Lehman et al. 1997; Susser et al. 1997; Humphreys and Rosenheck 1998; Lipton et al. 1988, 2000; Tsemberis and Eisenberg 2000; Cook et al. 2001; Kashner et al. 2002; Rosenheck et al. 2002).

Craig and Hodson (1998, 2000) studied health outcome, accommodation and employment in homeless youths in London, who were living in specialized shelters for this age group. Psychiatric disorder at index interview was not associated with accommodation outcome. Caton et al. (1993) traced and re-interviewed a small sample of 58 homeless individuals, recruited from a community-based housing program after six months and 18 months. He also assessed 42 homeless and mentally ill men after placement in community housing for a period of 18 months. At the 18 months follow-up the positive effects of the program had deteriorated. Herman et al. (1998) studied the course of psychoses in the homeless after in-patient treatment, and Sosin et al. (1990) traced only 59 % of 451 homeless individuals who were recruited from shelters and free-meal services only six months after the first interview.

In earlier papers we reported about the prevalence of

mental disorders (Fichter and Quadflieg 2001), the prevalence of alcoholism and psychiatric comorbidity in a representative sample of 265 homeless men in Munich (Fichter and Quadflieg 1999), somatic illness in the same sample (Fichter et al. 2000), and the course of alcoholism (Fichter and Quadflieg 2003). The aim of the current study is to report on the 3-year course of mental illness and the outcome concerning the housing situation in the same sample.

Following up a representative sample of homeless individuals over longer periods of time is a very tedious task. It was our aim to assess a larger representative sample of homeless men cross-sectionally at two points of time three years apart. We excluded homeless women for several reasons: 1) there are far less homeless women living on the streets of Munich, 2) relative to their number homeless women in Munich received more assistance and help in the community, 3) homeless women less frequently than homeless men live on the streets but are rather invited by men to stay with them. Thus common inclusion criteria for homeless men and women are difficult to find.

Method

▪ Measures and instruments

A German translation of the Structured Clinical Interview for DSM-IV (SCID-I) (cf. First et al. 1996; Wittchen et al. 1997) was used for assessing current and lifetime diagnoses of mental illness according to the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM IV, APA 1994) including disorders that began in the follow-up interval. Data on the use of medical services, sociodemographic variables, and several other areas were also obtained. The Mini Mental State Examination (MMSE) (Folstein et al. 1975) was used for the assessment of cognitive impairment, and all participants completed the self-rating Complaint List (CL) by von Zerssen (1976). Its 24 items, rated from 0 (not at all) to 3 (severely), with a maximum score of 72 points inquire about the intensity of somatic complaints such as headaches. At the first assessment a medical examination was conducted and blood was drawn. Results on physical illness at first assessment have been reported elsewhere (Fichter et al. 2000).

▪ Sample and design

Our *definition of homelessness* on which our inclusion criteria were based was as follows: 1) The person was male and his command of the German language was sufficient for conducting the interview, *and* 2a) the person did not have a home of his own and, during the last 30 days before the interview, he had been forced to sleep at friends', acquaintances' or relatives' homes; the stay with these friends, acquaintances or relatives was not continuous and the person had changed his sleeping place at least three times during the 30 days prior to assessment, or the person even had had to spend the nights in the open *or* 2b) during the 30 days prior to assessment the person lived in an emergency shelter for homeless men, where he had to apply for a bed each single night, *or* 2c) the person had spent the last 30 nights at places which are not intended for sleeping, such as parks, streets, railroad cars, unfinished buildings or dilapidated houses.

Base sample: It was our intention to assess a representative sample of homeless men in the city of Munich. However, when we started there was no information available about the size and composition of this population and the characteristics of its members. In order to get sufficient information about the population of homeless men in Munich, a base sampling procedure (Koegel et al. 1988) was used to esti-

mate the size and composition of the population of homeless men in Munich. Based on the results of this procedure, we classified homeless men into one of three exclusive sectors: 1) those who had used emergency shelters in the 30 days prior to assessment (*shelter sector*), 2) those who used free or inexpensive meal or counseling services but had not used shelters in those 30 days (*indoor/meal sector*) and 3) those who had congregated in the streets or in other outdoor settings but who had not used shelters or inexpensive meals or counseling services in those 30 days (*outdoor sector*).

A list of all facilities and places in the street where homeless were known to congregate from all three sectors was compiled. All individuals at these places were approached in 1994 and 1995 for a brief interview assessing where they had slept during the last 30 days and some socio-demographic characteristics. Persons reporting that they had a regular home (e.g. a rented apartment or a house) were dropped from the sampling procedure. A total of 1633 individuals (1530 males and 103 females) met some very wide definition of homelessness, with 839 meeting study criteria of homelessness. Based on these results and supplemented by further data from social agencies in Munich as well as additional expert consensus conferences with experts in the fields of social work with homeless in Munich we estimated that 1022 single homeless men were living in Munich at the time of the study with 27.5 % in the shelter sector, 64 % in the indoor/meal sector and 8.5 % in the outdoor sector. Seasonal effects were neglectible and no differentiation between seasons of assessment was made. For further information on the base sampling procedure see Fichter and Quadflieg (1999, 2001).

Main sample: A sample of homeless men selected for the main interview was drawn from each of the three sectors. It was only towards the end of the main interview period that the final distribution of homeless men across the three sectors emerged. Our base sampling data showed that we had performed an overproportional number of interviews with men in the shelter sector. Therefore a weighting procedure was introduced in order to account for the disparity between the number of interviews conducted in each sector and the actual number of men, as found in the combined base sampling. The weighting factor for the shelter sector was 1.78 (281/158), for the indoor/meal sector 6.88 (654/95) and for the outdoor sector 7.25 (87/12). The weighting technique has been described in detail elsewhere (Fichter and Quadflieg 2001). Interviews were conducted by specially trained medical doctors or by clinical psychologists. Individuals interviewed at each location were randomly selected in a two-step procedure. At first the interviewer counted separate groups of homeless men at each location. After choosing one group at random, one person within this group was chosen by another random procedure (Schnell et al. 1988). Of the 301 homeless men who were approached for the main interview, 265 (88 %) participated. Duration of interviews was about 140 minutes. A small monetary amount was awarded to participants. For further details about the sampling procedure in this sample see Fichter and Quadflieg (1999, 2001).

In the years 1997 to 1999 we made great efforts to trace the 265 homeless men in order to interview them again three years later. All contacts with social workers, homeless people and other relevant individuals were used to find the study participants. Notes calling for the former probands to contact our work group were posted in many institutions specialized on services for the homeless. Participants were traced in many cities scattered across Germany. A total of 185 probands (of the possibly 247 surviving homeless men, = 75 %) could be re-interviewed with the same interview used at the index assessment, slightly modified for follow-up purposes. Only six (3.1 %) of the surviving homeless men who were traced, refused to be re-interviewed. Thus, refusal to participate was very low and most of the attrition observed was due to our inability to locate study participants. Most of these men probably had left Munich. Within the city boundaries our network was very close so that chances to relocate a person in the city of Munich were very high. Therefore it is very likely that those who could not be relocated had moved somewhere else. Fifty-six homeless men could not be relocated and 18 probands had died before the 3-year follow-up. We were not able to obtain the causes of death for these individuals.

This paper reports the results of those men with both baseline and follow-up assessment. Of the 185 homeless men re-interviewed at follow-up, 116 belonged to the shelter sector, 65 to the free meal and

counseling sector and 4 to the outdoor sector. The average time interval between baseline and follow-up assessment was 3.2 (standard deviation 0.7) years. Length of follow-up interval did not differ between sector groups. Drop-out analyses showed no statistically significant differences between those probands who could be re-interviewed and those who could not be located, refused or were deceased at the follow-up assessment regarding duration of homelessness, age at baseline assessment and DSM-IV current or lifetime diagnoses at baseline.

■ Statistical analyses

All data reported here are weighted data. Each participant carried the statistical weight assigned to him at the baseline study as described above both for analyses of baseline and of follow-up data. This was done in order to make sure the follow-up data were representative for the population from which the baseline sample was drawn. For the weighted means the standard error is reported. Results of t-tests and chi^2-tests are reported where appropriate. McNemar's sign tests were used for comparing rates of remission or incidence in comparing baseline and follow-up results.

Logistic regression analyses were computed in order to identify predictors of good or poor outcome at follow-up. Standardized mortality ratio was computed on the basis of expected deaths between February 1995 and May 1998 in the German male population controlled by age groups as derived from mortality figures reported in the Federal Health Monitoring System of the Federal Statistical Office (http://www.gbe-bund.de).

Results

Mean age at the baseline assessment was 45.3 years (standard error SE = 0.7) in the total sample of 185 males who could be followed-up, and 48.5 (SE = 0.7) years at follow-up. At the baseline interview all homeless men by definition stayed overnight in emergency shelters, on the street, or in some other unusual sleeping condition. Table 1 gives an overview of the housing situation of these men, three years after index assessment.

About one quarter of the homeless men slept on the street or in an emergency shelter or with friends thus meeting once more the inclusion criteria of the baseline study: 8.1 % belonged to the shelter sector, 16.2 % to the indoor/meal sector, and 1.8 % to the outdoor sector. According to our data the season of the year at which the interview was conducted was not relevant for this outcome. Another quarter (28.6 %) lived in a rented apart-

Table 1 Housing situation in the last 30 days before follow-up interview in homeless men in Munich (N = 185 weighted cases)

	At 3 year follow-up %
Privately rented apartment	28.6
Board and care home for the homeless	19.5
On the street[a]	16.2
Emergency shelter[a]	8.1
Rehabilitation facility	7.7
Residential care facility	4.8
Voucher hotels	4.1
Therapeutic in-patient treatment	3.3
No information	2.5
Relatives, friends, acquaintances[a]	1.8
Jail	1.5
Room associated with work	1.3
Hospital	0.5

[a] At the initial (baseline) assessment all men lived either on the street, in shelters or with friends or acquaintances

ment at follow-up. The rest lived in accommodations of a less permanent character.

We found significant changes in marital status (Table 2) over the 3-year follow-up period. 2.8 % (0 % at baseline) of the homeless men married and lived with their partner during the follow-up interval. The percentage of those who had obtained a divorce had increased from baseline (33.9 %) to follow-up (40.5 %). Data on who initiated the divorce were not available. The rate of men who were married and lived separated from their wife was 6.9 % at baseline and 2.1 % at follow-up while the proportion of men who were never married decreased from 56.4 % to 52.6 %.

In our sample monthly income could only be assessed in categories covering ranges of amounts of money. Low income was defined as lying in the first quartile, high income as lying in the fourth quartile of the distribution of categories at the baseline assessment. Due to high percentages in the middle categories the first and fourth quartiles actually deviated from 25 %. Monthly income was low both at baseline and at follow-up. Generally the men of our sample showed a decrease

Table 2 Change of marital status from first assessment to follow-up in homeless men in Munich (N = 185 weighted cases)

At first assessment	At follow-up					Row total
	Married, living together	Married, living separated	Never married	Divorced	Widowed	
Married, living together[1]	0	0	0	0	0	**0**
Married, living separated	0	2.31 % (6)	0	4.61 % (6)	0	**6.92 % (12)**
Never married	1.27 % (2)	0	52.59 % (101)	2.54 % (4)	0	**56.4 % (107)**
Divorced	1.53 % (3)	0	0	32.36 % (58)	0	**33.89 % (61)**
Widowed	0	0	0	1.01 % (1)	1.79 % (4)	**2.80 % (5)**
Column total	**2.80 % (5)**	**2.31 % (6)**	**52.59 % (101)**	**40.52 % (69)**	**1.79 % (4)**	**100 % (185)**

chi^2 = 1223.0; df = 12; p < 0.01
Weighted percentages and unweighted number of cases (in parentheses) are given
[1] According to inclusion criteria this category was excluded at first assessment

in monthly income from baseline to follow-up (chi^2 = 25.0; df = 6; p < 0.01). The rate of those with a low monthly income of up to 256 euro increased from 15.9 % at baseline to 27.7 % at follow-up. A monthly income between 256 and 639 euro was reported by 62.2 % (baseline) and 57.3 % (follow-up). More than 639 euro were available to 20.9 % at baseline and to 15.1 % at follow-up. One percent did not give information on their income at the baseline interview. Concerning employment, 62.5 % of the homeless men reported that they had worked at some time during the follow-up interval. Vocational training was begun by 10.3 %.

Table 3 presents psychiatric comorbidity at the time of both assessments (one-month prevalence) and rates of incidence and remission. A slight increase of the prevalence of psychotic disorder was found from baseline to 3-year follow-up. Almost all cases with a psychotic disorder had schizophrenia. Mood disorders, substance use disorders, anxiety disorders, and any axis I disorder showed a significant remission rate. However, the prevalence rates were still very high at follow-up when compared to those in the general population. At both time points the rates of alcohol dependence were excessively high while the use of illegal drugs in this German sample was of minor concern.

Fluctuations of the presence of a cross-sectional diagnosis were considerable: 22.73 % had an axis I diagnosis at baseline but no longer at follow-up, and 9.99 % had had no diagnosis at baseline but had a diagnosis at follow-up.

Table 3 One-month prevalence of DSM-IV mental disorders in homeless men (N = 185 weighted cases) at first assessment (Baseline, BL) and at 3-year follow-up (FU)

Diagnosis	Changes of diagnosis				
	Baseline	3-year FU	Remission BL+ FU−	Incidence FU+	Mc Nemar df = 1
	%	%	%	%	
Psychotic Disorders[a]	4.38	5.70	0.52	1.84	5.1*
Schizophrenia	4.12	5.44	0.78	2.10	4.1*
Substance Induced Psychotic Disorder	0	0.26	0	0.26	ns
Psychotic Disorders NOS	0.26	1.06	0.26	1.06	ns
Mood Disorders[b]	19.17	12.22	8.22	1.27	34.8**
Major Depressive Disorder	6.97	2.33	5.91	1.27	20.5**
Bipolar I Disorder	2.31	0.26	2.31	0.26	11.2**
Dysthymic Disorder	1.27	0	1.27	0	ns
Mood Disorder due to a gen. med. condition	1.01	1.01	0	0	ns
Substance Induced Affective Disorder	8.88	8.88	0	0	ns
Cognitive Impairment					
MMSE = 0–17	2.02	2.07	1.01	1.06	ns
Substance Use Disorders	69.66	54.19	25.20	9.73	46.8**
Alcohol Abuse	1.53	2.28	1.53	2.28	ns
Alcohol Dependence	67.35	50.09	26.47	9.21	57.0**
Drug Abuse	0	0.26	0	0.26	ns
Drug Dependence	2.05	2.80	1.79	2.54	ns
Substance Induced Delirium (psychotic)	0.52	0.52	0	0	ns
Substance Induced Delirium (anxiety)	0.26	0.26	0	0	ns
Poly-Substance Dependence	0.78	2.28	0.78	2.28	5.0*
Anxiety Disorders[c]	10.98	5.42	7.61	2.05	21.9**
Panic Disorder with Agoraphobia	1.79	0.26	1.53	0	10.4**
Agoraphobia without History of Panic	3.55	0.78	3.29	0.52	13.7**
Social Phobia	2.33	1.58	1.27	0.52	ns
Specific Phobia	2.80	1.27	2.80	1.27	3.9*
Obsessive-Compulsive Disorder	0.26	0.26	0	0	
Posttraumatic Stress Disorder	1.01	0	1.01	0	ns
Generalized Anxiety Disorder	1.04	1.27	1.04	1.27	ns
Substance Induced Anxiety Disorder	1.79	1.79	0	0	ns
Adjustment Disorder	0.26	0	0.26	0	ns
Any DSM IV AXIS I Disorder (excluding cognitive impairment)	78.72	65.98	22.73	9.99	33.9**

BL Baseline; *FU* Follow-up; *BL+ FU−* present at baseline and absent at follow-up; *BL− FU+* absent at baseline and present at follow-up; *df* degrees of freedom; *ns* not significant; * p < 0.05; ** p < 0.01
[a] Prevalence of the following psychotic disorders was zero at baseline and at follow-up: schizophreniform disorder, schizoaffective disorder, delusional disorder, brief psychotic disorder, and psychotic disorder due to a general medical condition.
[b] Prevalence of the following affective disorders was zero at baseline and at follow-up: bipolar II disorder, bipolar disorder NOS, and depressive disorder NOS.
[c] Prevalence of anxiety disorder due to a general medical condition was zero at baseline and at follow-up.
[d] *MMSE* Mini mental State Examination

A significant reduction in the total score of the self-rating complaint list (CL) was observed over time. Scores changed from a mean of 18.2 (SE = 1.0) at baseline to 14.2 (SE = 0.8) at follow-up (t = 4.25; p < 0.01). In addition, all men rated their overall health status subjectively on a scale ranging from 0 (very good) to 4 (very bad). The mean score of 1.65 (SE = 0.08) at baseline improved to a score of 1.38 (SE = 0.07) at follow-up (t = 2.82; p < 0.01). At both times the homeless men rated their health status quite positive which was discrepant to the view of our research team.

Table 4 reports data on medical services use by homeless men. Inpatient treatment in a psychiatric hospital tripled after the baseline interview. The number of inpatient stays in psychiatric and somatic hospitals increased significantly in the second 3-year period (following first assessments). A large proportion received outpatient treatment after the baseline interview. However, only a low number – considering the high prevalence of mental disorders – visited a psychiatrist during the 3-year follow-up period.

In order to identify predictors of poor or good outcome concerning the living situation of the homeless men at follow-up, logistic regression analyses were calculated. Data of the main analysis are shown in Table 5 with poor outcome as the criterion (living on the streets, in emergency shelters or living with relatives, friends, acquaintances). The 15 predictors used in the analysis were selected according to theoretical considerations and were entered in one step (entering the predictors stepwise did not change the results significantly). The following variables were predictors of a poor outcome concerning the housing situation at 3-year follow-up: 1) inpatient stay in an alcohol treatment unit in the 3 years before follow-up, 2) no inpatient stay in a psychiatric hospital in the 3 years before follow-up, 3) did not resume work after initial baseline interview, 4) less years of education and, 5) (unexpectedly) shorter duration of homelessness. The other variables were not significant as predictors. We also calculated a logistic regression analysis with a wider criterion (poor or intermediate outcome) (not shown in Table 5). Including the intermediate outcome in the analysis leveled the results with inpatient treatments before follow-up no longer being predictive variables. Results based on the narrower criterion (poor outcome) were clearer and more straight forward and they are therefore presented here.

Based on the poor outcome criterion, psychiatric treatment reduced the risk of staying homeless to about one third, while homeless men receiving specialized inpatient treatment for their alcohol problem carried a very high risk of staying homeless. We computed another logistic regression analysis (not shown in the tables) including the same 15 variables for predicting having a permanent home at follow-up instead of sustained homelessness. There were three significant predictors for having a permanent home at follow-up that did not contribute significantly to the prediction of sustained homelessness: Higher monthly income at the baseline interview decreased the probability of having a home, while subjective "poor health" rating and inpatient rehabilitation increased it. In these analyses high daily amount of alcohol consumption lifetime at baseline interview and high daily amount of alcohol consumption after baseline until follow-up showed extremely large confidence intervals and standard errors. Dropping these two predictors from analysis, however, did not result in relevant changes to the results reported.

Table 4 Use of medical services by homeless men (N = 185 weighted cases)

	3 year time period before 1st assessment %	3 year time period before follow-up %	
a) Percentage of individuals who were treated as outpatients			
Psychiatrist	–	11.5	
General Practitioner	–	74.0	
Other	–	65.6	
Any out-patient treatment	–	92.7	
b) Percentage of individuals who were treated as inpatients			
Psychiatric hospital	4.9	17.5	
Somatic hospital (general, internal, surgery, other)	42.3	49.7	
Rehabilitation hospital	4.1	3.6	
Any in-patient treatment	47.7	54.7	
	Mean (SE)	Mean (SE)	t-test df = 682
c) Number of inpatient treatments			
Psychiatric hospital	0.07 (0.01)	0.26 (0.03)	7.6***
Somatic hospital (general, internal, surgery, other)	0.67 (0.04)	1.54 (0.10)	8.9***
Rehabilitation clinic	0.05 (0.01)	0.04 (0.01)	n. s.
Any in-patient treatment	0.79 (0.04)	1.84 (0.11)	10.3***

– data not available; *df* degrees of freedom; *n. s.* not significant
** p < 0.01; *** p < 0.001

Table 5 Results of main logistic regression analysis (N = 143 weighted cases)

Predictor	Criterion: Homeless at follow-up interview (living on the street, or sleeping in an emergency shelter, or staying overnight with friends) $R^2 = 0.17$	
	Odds ratio	95 % CI
More years of education at baseline	0.74	(0.59–0.95)
Inpatient stay in a psychiatric hospital in the 3 years before follow-up	0.37	(0.17–0.81)
Inpatient stay in an alcohol treatment unit in the 3 years before follow-up	6.58	(1.49–28.99)
Long duration of homelessness at baseline	0.76	(0.66–0.88)
Resumed work after baseline interview	0.43	(0.26–0.70)

Note: The following predictors were not significant: Higher monthly income at baseline, Inpatient stay in a rehabilitation facility in the 3 years before follow-up, Subjective "poor health" rating at baseline interview, Diagnosis of psychosis at baseline interview, Diagnosis of mood disorder at baseline interview, Diagnosis of anxiety disorder at baseline interview, Diagnosis of substance use disorder at baseline interview, Somatic complaints according to total CL score at baseline interview, High daily amount of alcohol consumption lifetime at baseline assessment, High daily amount of alcohol consumption after baseline until follow-up

An additional logistic regression analysis was run for predicting mental state (presence of any DSM-IV diagnosis) at the time of the follow-up (Table 6). The same predictors as in the previously described analyses were included except – for the reason given above concerning large standard errors – high daily amount of alcohol consumption lifetime at baseline interview and high daily amount of alcohol consumption after baseline until follow-up.

A diagnosis of substance use disorder at baseline interview increased the risk of having a mental disorder three years later more than fivefold. An inpatient stay in a psychiatric hospital in the three years before follow-up decreased this risk by the same factor. Thus receiving inpatient psychiatric treatment was a powerful predictor of a favorable outcome. Somatic complaints at baseline interview and a long duration of homelessness at baseline were less relevant predictors of an unfavorable outcome. To explore additional significant predictors "diagnosis of substance use disorder at baseline interview"

was dropped from the list of predictors and the analysis was re-run (Table 6, analysis 2). Higher monthly income was identified as an additional significant predictor. Also excluding "inpatient stay in a psychiatric hospital in the three years before follow-up" did not alter the results just mentioned.

Crude mortality rate was 6.8 % (18 of 265 men). The standardized mortality ratio amounted to 4.36 with the 95 % confidence interval between 2.35 and 6.38. All deaths occurred between age 40 and 59. Ten participants died aged between 40 and 49 years, and 8 participants died between age 50 and 59 years.

Discussion

The special features of our study were: 1) the representativeness of the sample, 2) a relatively long follow-up interval of three years, 3) a very low "drop out" rate of men who refused to participate, and 4) a large sample size

Table 6 Results of logistic regression analyses (N = 147 weighted cases): Predictors of having any DSM-IV diagnosis at follow-up

Predictor	Analysis 1 including substance use disorders $R^2 = 0.37$		Analysis 2 excluding substance use disorders $R^2 = 0.27$	
	Odds ratio	95 % CI	Odds ratio	95 % CI
Diagnosis of substance use disorder at baseline interview	5.22	(3.23–8.45)	excluded	–
Somatic complaints according to total CL score at baseline interview	1.03	(1.01–1.06)	1.04	(1.02–1.06)
Inpatient stay in a psychiatric hospital in the 3 years before follow-up	0.23	(0.12–0.43)	0.29	(0.15–0.53)
Long duration of homelessness at baseline	1.17	(1.01–1.35)	1.28	(1.12–1.47)
Higher monthly income at baseline	n. s.	–	1.46	(1.06–2.02)

n. s. not significant; – not applicable
Note: The following predictors were not significant in both analyses: More years of education at baseline, Resumed work after baseline interview, Inpatient stay in an alcohol treatment unit in the 3 years before follow-up, Inpatient stay in a rehabilitation facility in the 3 years before follow-up, Subjective "poor health" rating at baseline interview, Diagnosis of psychosis at baseline interview, Diagnosis of mood disorder at baseline interview, Diagnosis of anxiety disorder at baseline interview

that could be re-interviewed. Sophisticated sampling methods were used in order to obtain a representative sample of homeless men in Munich. Great efforts were made to obtain a high participation rate both for the baseline interview and the follow-up assessment. At both assessments standardized diagnostic instruments for reliable and replicable results were used. Attrition was due to problems in locating subjects and not the subjects' refusal to be re-interviewed. Our re-interview rate compares favorably with that of other studies. Craig and Hodson (1998, 2000) traced and interviewed 107 of the remaining 159 subjects (67.3 %) after 1 year. Other studies showed comparable (Sosin et al. 1995) or smaller re-interview rates (Caton et al. 1993; Sosin et al. 1990) for shorter follow-up intervals. The current study adds substantially to these data given its longer time period, the sophisticated sampling methods used to obtain a representative sample of homeless men, and the study's relatively low "drop-out" rate.

In our sample about one quarter of the homeless men still met our original definition of homelessness three years later which may be considered a poor outcome of the housing situation. Another quarter showed a good outcome of the housing situation and lived in a privately rented apartment at 3-year follow-up. Interestingly, monthly income did not increase in our group of homeless men indicating considerable dependence on public support and welfare even after improvement of the housing situation. This is especially true for those men living in board and care centers and shelters which are exclusively financed by public funds or private sponsors. Sosin et al. (1990) reported that only a small proportion (about 20 %) of their sample paid all or some of the rent of their dwelling. This is comparable to the 26.6 % found in our sample living in an apartment, the rent for which was paid in full or partially by public funds. While at the first assessment all men lived on the street or were found in an overnight shelter, three years later more than 75 % lived in a more permanent accommodation. Of Craig and Hodson's (2000) 107 youths 42 % lived in an excellent or good housing situation one year after intake into the study. Sosin et al. (1990) found 40 to 49 % of their samples to be domiciled 6 months after the first assessment. Different from our study, most of Sosin et al.'s (1990) homeless lived in private dwellings (88 to 92 % of those who were domiciled). Employment rate at any time in the 3-year follow-up period in our study (63 %) was higher than in the 18 months observed by Caton et al. (1993) (29 %). However, one must keep in mind that Caton et al. (1993) reported on chronically mentally ill homeless while our homeless were not selected for mental illness.

Generally there was a considerable amount of fluctuation (remission and incidence) of cross-sectional psychiatric diagnoses over the 3 years of observation. There are very few studies reporting on the change over time of prevalence rates in homeless people. Sosin et al. (1990) reported an increase of "binge drinkers" from 16.9 % to 32.5 % within 6 months. Craig and Hodson

(1998, 2000) using the CIDI for DSM-III-R reported 62 % with psychiatric disorders at baseline assessment and 55 % at 1-year follow-up. Two thirds of those with a mental illness at first assessment still showed mental disorders one year later. In our sample about 23 % remitted from the first to the second assessment and about the same percentage (56 %) as in Craig and Hodson's sample had a mental illness at both time points.

The use of outpatient treatment services for homeless men has apparently increased over the years and decades. In an earlier study we had assessed a sample of homeless men in Munich independent from the current sample. Results of this earlier study carried out in 1988 had shown that about 16 % had visited a psychiatrist at any time in their adult life and about 30 % (lifetime) had visited a general practitioner or some medical specialist (Meller et al. 2000). In the present study the number of inpatient treatments as well as the number of individuals treated in psychiatric or somatic hospitals increased over time. Considering the high prevalence of mental illness the use of psychiatric inpatient services still constitutes underutilization, and outpatient psychiatric services should be offered to homeless persons at lower threshold. There are several possible reasons for the increase of medical/psychiatric service utilization, the remarkable rate of remission of mental illness and the improvement of the subjective feeling of well-being: (1) There were a number of structural changes concerning the offers of outpatient medical services made in Munich during the study period which changed the opportunities for the homeless to receive medical care. The number of physicians offering special services for the homeless increased, including a very important outreach component in the form of a mobile physician's office built into a motorcar. With this vehicle general practitioners visited the homeless individuals in the parks, on the streets and at their sleeping places during the evening and night, offering medical care on the spot and without many questions being asked. At the same time practically all shelters tried to include the services of a physician who offered visiting hours at the shelters on a regular basis. (2) The housing situation improved over time. The effects of improvement in the housing situation for homeless men is explored in more detail in a separate study by our group (Fichter and Quadflieg, in press). (3) Our initial baseline assessment included a medical examination (cf. Fichter et al. 2000) and a thorough interview regarding mental state. This may have increased awareness of mental and somatic illness and needs among physicians, social workers and the homeless men themselves. (4) Another reason for the high remission rates may be 'spontaneous remission'. Considering the high chronicity of illness in our sample this explanation seems less likely.

A considerable percentage of psychiatric inpatients are described as "heavy users" or "high utilizers" of psychiatric services. Krautgartner et al. (2002) found over a 5-year time period a decrease from 7.8 % to 1.7 % of individuals who were hospitalized in a psychiatric unit for

at least 12 months without interruption. "High utilizers" are described as largely having no job, never having been married, living as singles, having problems with their accommodation situation (often debts concerning rent or conflicts with neighbors), living in financial straits and suffering from psychosis or mood disorders (Richter et al. 2002; Roick et al. 2002), thus in several aspects resembling the homeless men in our study. Of the 185 men in our study, none reported a longer stay in hospital as the sole reason for becoming homeless. Nine individuals gave this reason along with other explanations for their loss of a home. One additional man lost his accommodation, which was associated with his work, while spending some time in prison. In a large study following long-stay psychiatric patients discharged to the community for 5 years only a very small percentage (between 1 and 6 of 278 individuals) was surmised to having become vagrant (Dayson 1993; Leff et al. 1994). It seems that in spite of all similarities little overlap between homeless people and "high utilizers" exists.

Crude mortality rate in our sample over three years was 6.8 %. A large Scandinavian register study reported a crude death rate of 5.4 % for homeless men over a similar time period (Alstrom et al. 1975); expected crude death rate was 1.4 % in this same study, indicating excessive mortality in homeless men. Other studies (Barrow et al. 1999; Kasprow and Rosenheck 2000; Babidge et al. 2001; Nordentoft and Wandall-Holm 2003) reported mortality in longer time periods and found crude mortality rates between 11.6 and 24.4 %. In our sample the standardized mortality ratio (SMR) was 4.4. In other studies standardized mortality rates for homeless men were reported to be 2.8 (Nordentoft and Wandall-Holm 2003) and 3.8 (Babidge et al. 2001). So our study confirms the excessive mortality in homeless men and SMR was even higher than in the other cited studies.

There are some limitations to this study. (1) *Sample:* While our sample size (N = 185 persons assessed twice) is rather large, it is not sufficient to allow for a detailed breakdown. The data on the outdoor sector are based on only four males whose data are weighted rather strongly; this could possibly have led to some distortion of the results. (2) *Design:* The study is prospective and longitudinal with two cross-sections three years apart; however, based on this design we cannot derive cause-effect relationships. Especially the simultaneous changes in the housing situation and the medical services over the relevant years sets limits concerning the interpretation of the data and concerning the "natural" course and outcome of mental illness in the population of homeless men in a larger city. Another aspect is that the extensive interview and medical examination at the baseline assessment may have constituted a massive intervention. We enlisted the help of the workers in the social support system to re-locate our probands. Therefore an increased awareness of the medical needs of our probands in themselves as well as in their counseling persons may have gone along with an increased availability of medical services. (3) *Instruments:* Diagnosis of

mental illness was based on the SCID. Comparison data using the SCID in the general population are unfortunately lacking. However, the prevalence rates found in our sample were several times higher than what would be expected in the general population.

Risk factors for becoming homeless were found to be a low grade of schooling with a consequent low income, drinking high amounts of alcohol at an early age, strange social behavior (Koegel et al. 1988; Fichter et al. 1996), psychosis or mood disorder, a conflicting partnership ending in divorce (Fichter and Quadflieg 1999, 2001) and disruptive childhood experience (Susser et al. 1993). If a combination of these factors is present in a person in difficult times (e. g. a high unemployment rate, lack of affordable housing, or the increasing requirement for higher vocational qualification) the likelihood that he becomes or stays homeless is very high. Interestingly, for a considerable part the predictors of staying homeless are not the same as for predicting life in a permanent home at follow-up. Our logistic regression models offered some insights into the factors contributing to the maintenance of homelessness. Our data point at the immense risk immanent to alcohol use for the chronic course of homelessness. Alcohol dependence showed the highest prevalence of any single disorder in our sample. Carrying a diagnosis of substance use disorder at the baseline interview increased fivefold the risk of having a mental illness three years later, and inpatient treatment for alcoholism indicated a high increase of the risk to continue life on the street. Our logistic regression data do not support the notion (at least not in the very low income segment) that higher income should increase the probability of having a permanent home. Longitudinal data by others (Sullivan et al. 2000) indicate that the quality of life of homeless persons was influenced among other things by their income. In a time of economic strains and technological advance it is increasingly difficult to find a job as an unskilled worker. While inpatient psychiatric treatment for homeless men had very positive effects and decreased the risk of living on the street, it will not be sufficient to enable them to live in a permanent home. Additional medical, psychological and social rehabilitation measures increased the probability of living in a permanent home and should be made available to homeless individuals. As in the study of Craig and Hodson (1998, 2000) psychiatric illness at the baseline interview was not associated with accommodation outcome in our study. However, our data show that inpatient psychiatric treatment led to a fivefold decrease of the risk of having a mental disorder. This is encouraging news for us psychiatrists to bring our services closer to the homeless persons in need, to "the forgotten minority" (Rössler et al. 1994). Overall this is likely to reduce costs for medical services for the homeless because then fewer admissions to expensive emergency units will be necessary.

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