

to these data and for help with this project. This follow up study was supported by a grant provided by the Mental Health Foundation.

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## Comparison of prevalence of schizophrenia among residents of hostels for homeless people in 1966 and 1992

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### Abstract

**Objective**—To determine whether the prevalence of schizophrenia among the homeless population of Edinburgh resident in hostels has changed between 1966 and 1992.

**Design**—Comparison of two cross sectional surveys.

**Settings**—Hostels for homeless people in Edinburgh.

**Subjects**—In 1966 a random sample of 98 residents of three common lodging houses. In 1992 a random sample of 198 residents of nine hostels.

**Main outcome measure**—Prevalence of schizophrenia.

**Results**—The prevalence of schizophrenia in 1992 was 12/136 (9%) compared with 20/79 (25%) in 1966 (odds ratio 0.29; 95% confidence interval 0.13 to 0.62;  $P=0.001$ ). Adjustment for confounding by age, current hostel, and duration of unemployment by means of logistic regression produced an adjusted odds ratio of 0.22 (0.08 to 0.58).

**Conclusions**—The prevalence of schizophrenia was lower in 1992 even after other changes in the population resident in hostels occurring between 1966 and 1992 were taken into account. The findings are not consistent with an increase in the prevalence of schizophrenia among homeless people despite a 66% reduction in adult psychiatric beds in the region during 1966-92.

### Introduction

There has been considerable concern that the high prevalence of schizophrenia among homeless people, which has been estimated to be as much as 50%,<sup>1</sup> may be due to the reduction in numbers of psychiatric beds and the policy of community care pursued over the past three decades.<sup>2</sup> Recently it has been acknowledged, however, that it is unlikely that the closure of psychiatric institutions is entirely responsible for the high prevalence of psychotic disorders among homeless people,<sup>3</sup> and earlier work in the United Kingdom also found a high prevalence of schizophrenia in this group.<sup>4,5</sup> In the absence of repeated studies of the same population it remains uncertain whether or not there has been an increase and, if so, to what extent closure of psychiatric beds is responsible.

We determined the prevalence of schizophrenia among the residents of hostels for homeless people in Edinburgh in 1992 and compared it with original data records from the 1966 study of the residents of Edinburgh lodging houses by Priest.<sup>4</sup> This provided a unique opportunity to assess changes in a discrete population.

### Subjects and methods

The residents of hostels or common lodging houses form only one subgroup of the total homeless population, which also includes the "roofless" and residents of bed and breakfast accommodation. No attempt was made to include these other groups in this study.

#### 1966 SURVEY<sup>4</sup>

**Sample**—Priest randomly sampled 98 subjects from the residents of three common lodging houses in the Old Town of Edinburgh (Salvation Army, Grassmarket Hostel, and Greyfriars Hotel).

**Assessments**—All interviews were performed by Priest. The relevant parts of the interview for the present study consisted of a semistructured interview, including questions on demographic and social data, history of employment, contact with the law, contact with welfare agencies, and psychiatric history; clinical interview; and the symptom sign inventory,<sup>6</sup> an early example of a standardised psychiatric interview consisting of a battery of 80 questions to produce a psychiatric diagnosis. Subjects received a packet of cigarettes on completing the interview. Clinical diagnoses of schizophrenia were made on the basis of all information available and classified as probable and definite. Most subjects diagnosed as suffering from schizophrenia experienced hallucinations, paranoid delusions, and replied affirmatively to the question designed to elicit primary delusions. Cases classified as probable schizophrenia were not counted as schizophrenic for the purposes of the present study.

#### 1992 SURVEY

**Preparation**—Careful preparation and field work is necessary in surveys of homeless people.<sup>7,8</sup> Before the survey all the hostels for the homeless were visited by the team to gain the cooperation of the staff. The study was described to the Southside and Old Town com-

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munity care forum, a body representing all agencies concerned with providing services for homeless people in the area. JG and RN were already familiar with the hostels through running a psychiatric clinic for homeless people, and GY had previously worked in the Cowgate day centre, a facility for the homeless population of Edinburgh.

**Sample**—The aim of sampling was to achieve a representative sample of the homeless people resident in hostels in Edinburgh Old Town and Leith. We expected that there would be an increase in the prevalence of schizophrenia in the 1992 sample. The power of the investigation to detect an increase in the prevalence of schizophrenia from 25% to 50% at  $P < 0.05$  by using samples of equal size (the response rate in 1966 limited this to 79 observations in each sample) was calculated to be about 90%.<sup>9</sup> We therefore decided to aim for a sample size of at least 150 to allow for a potential 50% non-response rate, which was considered possible in this population. The sampling frame comprised all subjects resident in nine hostels in Edinburgh on 25 May 1992. The hostels included in the sample were Jericho House, Leith Lodging House, the People's Palace, Cranston Street, Salvation Army, Greyfriars Hotel, Stopover, Cyrenians, and Bowfoot. A 50% random sample was taken from the listing for each hostel. A sample of 198 was produced.

**Assessments** were conducted by two trained interviewers (SB and GY). Each assessment typically lasted one to three hours and consisted of the administration of two instruments. Firstly, we used a semistructured interview designed specifically for the study covering demography, use of services, and forensic history. Questions from Priest's study in 1966 were included in the sociodemographic schedule to allow direct comparison between the two samples. Secondly, we used the present state examination,<sup>10</sup> a widely used semistructured interview for the rating of psychiatric symptoms which has been shown to be reliable in community screening when used by non-medical interviewers.<sup>11,12</sup> Because we expected a high prevalence of schizophrenia and because the reliability of the examination in such subjects when used by non-medical interviewers has not been shown,<sup>11</sup> all interviews were audiotaped and all subjects with any positive symptom ratings and a random sample of those with none were rerated by a psychiatrist (JG and RN). Schizophrenia was diagnosed according to the *Diagnostic and Statistical Manual of Mental Disorders*, third edition, revised (DSM-III-R)<sup>13</sup> on the basis of all relevant information—that is, the present state examination, history, and case notes when available. Both interviewers had substantial previous experience of subjects with psychotic illnesses (one had worked as a support worker for people with long term mental health problems and the other had worked in a day centre for the homeless) and also received further training. The interviewers and psychiatrists had formal training in administering the present state examination before the study, which ensured high agreement between assessors.

**Response rate**—Previous studies have found a high rate of non-response in similar populations. To assess the bias introduced by non-response as much information as possible was obtained on non-responders. This usually included age and sex. Information from the Lothian psychiatric case register was obtained for the whole sample to provide validation of the self reports of the subjects and also to provide an estimate of the psychiatric morbidity among the non-respondents. The register is a computerised case register which has recorded contacts with inpatients within Edinburgh since 1970 and all contacts with the psychiatric services within Edinburgh and part of Lothian since 1978. All subjects were paid £5 on completion of

the interview, and the interviews were performed between 25 May and mid-September 1992. The study protocol was passed by the ethics of medical research (psychiatry and clinical psychology) subcommittee of Lothian Health Board.

#### VARIABLES EXAMINED

Table I shows the variables we could examine on the basis of comparable information. These included several which probably altered between 1966 and 1988—in particular, the age distribution, unemployment rates, and the prevalence of schizophrenia. During the period between the two studies there were changes in the hostels themselves. Several of the hostels from which the 1966 sample was drawn had closed and new hostels had opened. Hostels catering for particular groups—for example, Stopover, for young homeless people—opened in response to changing needs. Although the 1992 sample was representative of the population resident in hostels at that time, some of the observed differences between the two samples are possibly because of sampling bias. A further dichotomous variable was therefore introduced to discriminate between the subjects who lived in the hostels open in 1992 that most closely resembled those from which the 1966 sample was drawn and the subjects residing in more recently opened hostels, which often catered for particular subgroups. This restricted the 1992 sample to subjects resident in the Greyfriars Hotel (run by the district council), the Salvation Army Hostel for men, the Peoples' Palace (Church of Scotland), Jericho House (Benedictine Order), and Cranston Street hostel for women. All these hostels are in Edinburgh Old Town and have admission policies and facilities broadly comparable with the hostels sampled in 1966.

A second diagnostic variable was constructed to allow comparison of non-respondents from the 1992 survey to give a measure of response bias. This used diagnoses on non-respondents estimated from infor-

TABLE I—Demographic and psychiatric comparison of samples of homeless subjects from 1966 and 1992

Variable	No (%) in 1966	No (%) in 1992
Schizophrenia	20/79 (25)	12/136 (9)
Men	64/79 (81)	175/198 (88)
Age (years):		
< 19		10/197 (5)
20-39	7/79 (9)	53/197 (27)
40-59	33/79 (42)	61/197 (31)
60-79	37/79 (47)	64/197 (32)
> 80	2/79 (3)	9/197 (5)
Marital status:		
Single	51/78 (65)	75/140 (54)
Married	3/78 (4)	1/140 (1)
Widowed/divorced/separated	24/78 (31)	64/140 (46)
Country of birth:		
Scotland	55/79 (70)	109/138 (79)
Rest of United Kingdom	20/79 (25)	23/138 (17)
Other	4/79 (5)	6/138 (4)
Unemployment:		
Employed	19/68 (28)	7/140 (5)
0-11 Months	11/68 (16)	18/140 (13)
> 12 Months	38/68 (56)	113/140 (81)
Never employed	0	2/140 (1)
Duration homeless:		
< 1 Month	3/79 (4)	14/139 (10)
1-11 Months	11/79 (14)	15/139 (11)
12-59 Months	17/79 (22)	37/139 (27)
> 60 Months	48/79 (61)	37/139 (55)
Reason for homelessness:		
Psychiatric	0	13/139 (9)
Drugs/alcohol	3/77 (4)	13/139 (9)
Family/relationship	33/77 (43)	52/139 (37)
Financial	10/77 (13)	28/139 (20)
Other	31/77 (40)	33/139 (24)
Prison history	16/77 (21)	58/139 (42)
Alcohol abuse	24/74 (32)	71/140 (51)
History of admission to psychiatric hospital	6/74 (8)	28/140 (20)
Registered with general practitioner	68/77 (88)	128/140 (91)
Cigarette smoker	49/70 (70)	124/140 (89)
Comparable hostel	75/79 (95)	72/198 (36)

mation from the psychiatric case register and hospital case notes when available.

#### STATISTICAL ANALYSIS

The hypothesis that there was no difference between the prevalence of schizophrenia in 1966 and 1992 was tested by using univariate logistic regression, which was performed with the EGRET computer program.<sup>14</sup> The dichotomous dependent variable was the presence or absence of schizophrenia. The characteristics of the subjects may have changed in several other ways apart from any possible change in the prevalence of schizophrenia. Homeless people today are often younger than those in the past.<sup>15,16</sup> Timms and Fry found a higher incidence of schizophrenia among the longer stay residents in a Salvation Army hostel in London.<sup>17</sup> Changes in the profile of homeless people in variables such as these could potentially explain any change in prevalence found in the present study.

The findings in table I show several possible changes between the two samples. In particular, in the 1992 sample a higher proportion of the subjects seemed to be aged under 40 years, more subjects gave psychiatric illness and alcohol or drug abuse as the reason they were homeless, and more gave a history of admission to psychiatric hospital. In 1992 fewer subjects were resident in the hostels selected as being strictly comparable with those in existence in 1966. Age, duration of homelessness, duration of residence in the current hostel, current hostel and prison history were selected as potential confounders. For the purposes of the analysis we had to reduce the data into dichotomous variables. Age was dichotomised into <40 years *v* ≥40 years; duration of homelessness, duration of residence in current hostel, and duration of unemployment were each dichotomised into <1 year *v* ≥1 year.

To model the effect of these other changes on the crude odds ratio for the period the univariate logistic regression model was extended by fitting, one at a time, terms representing the dichotomised variables selected as potential confounders. At each extension, the effect of adding the term on the odds ratio for period was assessed. Terms which substantially (defined as a change of at least 10%) altered the estimate of the odds ratio for period were retained in the model. Only observations with complete data were used for fitting this model. Finally, by using the variable constructed with the data from the register to estimate diagnoses in the 1992 cases with missing diagnostic data, we calculated a univariate odds ratio to estimate the bias introduced by the non-respondents. This was then adjusted, when possible, for the effects of those variables which were included in the main analysis.

#### Results

Table II shows the crude odds ratios for the effect of period and the potential confounding variables on the prevalence of schizophrenia. The prevalence of schizophrenia in 1992 was 12/136 (9%) compared with 20/79 (25%) in 1966 (odds ratio 0.29; 95% confidence interval 0.13 to 0.62; likelihood ratio statistic 10.3 on

TABLE II—Univariate odds ratios (95% confidence intervals) for effect of period and potential confounding variables on prevalence of schizophrenia among homeless subjects in 1992 compared with data from 1966

Variable	Odds ratio (95% confidence interval)
Period=1992	0.29 (0.13 to 0.62)
Age < 40 years	0.29 (0.08 to 1.00)
Duration homelessness ≥ 1 year	1.91 (0.63 to 5.77)
Resident in present hostel for ≥ 1 year	0.67 (0.26 to 1.84)
Comparable hostel	1.46 (0.62 to 3.45)
Prison history	1.81 (0.85 to 3.87)

1 df; *P*=0.001). Of the 12 schizophrenic subjects found in the 1992 sample, eight were currently in contact with the psychiatric services. This was in contrast with 1966, when none of the 20 schizophrenic patients identified were receiving any form of psychiatric treatment. Table II shows that schizophrenic subjects were less likely to be aged under 40 years (0.29; 0.08 to 0.99). The other potential confounders were not significantly associated with schizophrenia.

In the logistic regression age, current hostel, and history of imprisonment individually affected the estimate of the odds ratio for the effect of period by at least 10%. Controlling for these factors simultaneously produced an adjusted odds ratio for the effect of period of 0.22 (0.08 to 0.58; 10.21, 1 df; *P*=0.001). This implies that the lower prevalence of schizophrenia in the 1992 sample could probably not be explained by other changes in the population of the hostels.

No information was available on the non-respondents in the 1966 study. Of the 62 (31%) subjects in the 1992 sample who were not interviewed, 17 declined interview, 44 could not be traced, and one subject had died.

When we used data from the psychiatric register to estimate the prevalence of schizophrenia among the non-respondents the unadjusted odds ratio for the effect of period was 0.24 (0.12 to 0.51; 14.6, 1 df; *P*<0.001). Because of the constraints imposed by missing data the only adjustment possible was for the effects of age and hostel. This produced an adjusted odds ratio of 0.29 (0.12 to 0.71; 7.8, 1 df; *P*=0.005). This is comparable with the estimate produced in the main analysis and implies that it is unlikely that there was significant non-response bias.

#### Discussion

We have shown that the prevalence of schizophrenia was significantly lower among those residents in hostels in 1992 (9%) than in a broadly comparable sample in 1966 (25%). This difference was not explained by other changes in the hostel population between the two periods.

The study has several limitations. Comparison of the findings is limited by the methodological differences between the two surveys. Caution is particularly required in the comparison of the prevalence rates for schizophrenia of the two studies. Diagnoses in the 1966 survey were clinical diagnoses made by a psychiatrist whereas in 1992 diagnoses were made according to criteria of DSM-III-R on the basis of audiotaped interviews, case notes, and any other information available. Despite these reservations, however, we consider that the diagnoses are sufficiently comparable for the purposes of the current study.

The 1992 non-response rate of 31% may have introduced a bias. The use of the psychiatric case register to estimate prevalence of schizophrenia among the non-respondents, however, did not substantially change the odds ratio for schizophrenia between the two samples. Schizophrenic patients who had avoided hospital contact altogether would not be registered and may also be less likely to participate in the survey. We cannot exclude the possibility of a residual non-response bias.

The prevalence of schizophrenia in the 1992 sample (9%) is comparable with that reported for schizophrenia among homeless people by the National Institute of Mental Health in the United States (11-13%).<sup>18,19</sup> It is, however, lower than the prevalence of 31% found in a large Salvation Army Hostel near Waterloo station, London.<sup>17</sup>

Our findings may be specific to Scotland and not applicable elsewhere. Closure of psychiatric beds has proceeded at a slower rate in Scotland than elsewhere in the United Kingdom.<sup>20</sup> In the Lothian region,

### Social implications

- The prevalence of mental illness among homeless people is high
- The prevalence of schizophrenia among residents of hostels in Edinburgh was lower in 1992 (9%) than in 1966 (25%) despite the 66% reduction in non-geriatric psychiatric beds over the same period
- The policy of community care and reduction in numbers of psychiatric beds need not lead to an increase in the prevalence of schizophrenia in homeless people in hostels
- The prevalence of schizophrenia among homeless people remains much higher than in the general population

however, the total number of non-geriatric adult psychiatric hospital beds has decreased by 66% between 1966 and 1992 (information and statistics division, NHS in Scotland Common Services Agency, personal communication). Our findings therefore suggest that despite a substantial reduction in the number of psychiatric beds the prevalence of schizophrenia among the homeless resident in hostels has not increased. Low rates of homelessness among discharged long stay patients in other parts of the United Kingdom provides some evidence that this finding also applies elsewhere.<sup>21-23</sup>

The lower prevalence of schizophrenia in the 1992 sample may be explained by developments in the provision of health services to homeless people in Edinburgh. In particular, primary care services dedicated to such people have been provided firstly through a "house doctor" scheme<sup>24</sup> and subsequently through a general practice based in the skin clinic (premises originally built as a deinfestation centre and now used as a health centre) in the Grassmarket. Since about 1980 there has also been a psychiatric clinic dedicated to meeting the needs of homeless mentally ill patients held at a site close to the Grassmarket. This is currently held every two weeks and is staffed by a psychiatrist of senior registrar grade, a community psychiatric nurse, and a mental health outreach worker. Improved access to health services may also therefore explain the increase in the proportion of subjects reporting psychiatric contact in the 1992 sample.

Schizophrenic subjects, particularly those who are homeless, are often itinerant. The fairly low prevalence of schizophrenia among the 1992 population may be explained by an increased rate of migration of such subjects from Edinburgh to other parts of the United Kingdom, particularly London.

The prevalence of schizophrenia in 1992 was higher than the lifetime prevalence among the general population, which is generally accepted to be in the range 0.5%-2%.<sup>25</sup> Few hostel workers have formal training in caring for people with such disorders, although recently training programmes have been started. Contact with psychiatric services need not necessarily imply that health needs are being met appropriately. Hogg and Marshall found that despite a specialised general practitioner service and weekly visits from a psychiatric registrar there was still considerable unmet need as measured by the needs for care schedule of the Medical Research Council.<sup>26,27</sup> Comprehensive, intensive, and multidisciplinary systems of care incorporating outreach intervention and a wide range of housing options and dedicated to meeting the needs of mentally ill people who are homeless have been advocated.<sup>28</sup>

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### Corrections

#### Osteoarthritis of weight bearing joints of lower limbs in former elite male athletes

A printer's error occurred in this paper by Urho M Kujala and others (22 January, pp 231-4). The penultimate sentence of the third paragraph of the discussion should have read: "Some cases of osteoarthritis of the knee [not hip] may be prevented by preservative treatment of meniscal injuries. . . ."

#### Risk of gynaecomastia associated with cimetidine, omeprazole, and other antiulcer drugs

An authors' error occurred in this paper by Luis Alberto Garcia Rodriguez and Hershel Jick (19 February, pp 503-6). Line 8 of the Discussion section should read, "16 [not 15] went on to develop gynaecomastia." ASS