

## The Incidence of Schizophrenia in Croatia

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Hospital-based annual incidence rates for schizophrenia in Croatia over 1965–84 did not change significantly. Rates ranged from 0.21 to 0.22 per 1000 population (0.26–0.29 per 1000 population aged over 15). Factors that could influence these rates were analysed, but it appeared that the rates were a true reflection of the incidence rate of schizophrenia in the Croatian population.

Incidence rates for schizophrenia reported in the literature for individual populations differ. For example, the respective one-year incidence rates per 1000 for Norway, Mannheim and Iceland were 0.24 (Astrup, 1982), 0.59 (Häfner & an der Heiden, 1986), and 0.27 (Helgason, 1977), whereas Denmark had a strikingly low female incidence rate of only 0.06 (Dupont & Weeke, 1977). Giel *et al* (1980) also reported a low incidence rate for schizophrenia combined with paranoid and reactive psychoses of 0.11. In Salford, UK, Hailey *et al* (1974) reported the same incidence rate, although for schizophrenia only. In the US, different workers have found incidence rates for schizophrenia to range from 0.43 to 0.69 per 1000 per year, with that for the population over 15 ranging from 0.30 to 1.20 (figures quoted from Freedman *et al* (1980)). In Yugoslavia, Kaličanin (1987) showed Belgrade's incidence rate for schizophrenia to be 0.22.

Incidence rates can however be influenced by differing methodological and diagnostic criteria. The findings of an extensive study by the World Health Organization (WHO) (1973) helped in reaching a consensus on these. Also important are the operationalised criteria of standardised interviewing techniques (Wing *et al*, 1974). Recent WHO investigations (Sartorius *et al*, 1986) indicate ways in which different diagnostic definitions may affect reported incidence rates.

Despite the occasional large differences in incidence rates for schizophrenia between individual populations, they were held to be constant in a given population. However, some reports indicated that they are changeable (Hare, 1974; Eagles & Whalley, 1985; Strömngren, 1987), intensifying interest in investigations in this area.

We undertook to analyse incidence rates for schizophrenia in the population of Croatia, one of six Yugoslav republics, with a population of 4 601 469 in 1981.

### Method

The present findings are chiefly based on data from SR Croatia's Psychiatric Case Register (CPCR). Since 1962 the CPCR has been run by the Chronic Disease Service, the Epidemiology Department, and the Institute of Public Health of SR Croatia. It is a case-name register designed for following up the republic's schizophrenic patients treated in psychiatric institutions. The CPCR has so far used diagnostic criteria from ICD-7, ICD-8, and ICD-9.

A modified hospital statistical card (the P-card) is the register's source of information. It is completed regularly for each psychiatric discharge, as well as annually for all patients in institutions on the census day (31 December).

Data processing at the CPCR is electronic. The basic register file is set up for each case, with the patient's identification information recorded, along with data on every admission, sorted chronologically. Thus, the first admission in the sequence is the 'incidence' admission.

Total male and female schizophrenic incidence admissions were obtained for every year between 1965 and 1984 by analysing CPCR data.

In calculating hospital incidence rates, Croatia's population size, and sex and age figures appearing in regular statistical publications were used.

### Results

Table 1 shows incidence admission rates for schizophrenia over 1965–84, by sex. These were given in terms of total population and that above 15. Rate changes over this period were not significant ( $P > 0.10$ ).

### Discussion

The CPCR data indicate that incidence admission rates for schizophrenia in Croatia over 1965–84 were virtually constant, varying between 0.21 and 0.22, and 0.26 and 0.29 per 1000 and per 1000 population above 15, respectively. The male incidence admission rate was slightly higher than the female rate.

Incidence rates based on hospital statistics may not accurately depict the real situation in a population.

TABLE I  
Average annual rates of hospital incidence for schizophrenia per 1000 inhabitants in Croatia, given in five-year periods between 1965 and 1984

Population	Period				r	t <sub>b(x)</sub>	P
	1965-69	1970-74	1975-79	1980-84			
All ages							
male	0.21	0.23	0.22	0.23	0.67	1.29	NS
female	0.20	0.22	0.21	0.21	0.32	0.47	NS
Total	0.21	0.22	0.22	0.22	0.77	1.73	NS
Over 15 years of age							
male	0.28	0.30	0.28	0.29	0.14	0.19	NS
female	0.26	0.28	0.27	0.26	-0.13	-0.19	NS
Total	0.28	0.29	0.27	0.26	-0.80	-1.89	NS

Over a longer period, changes in diagnostic criteria and practice can influence hospital-based incidence values.

Firstly, three ICD revisions (7,8,9) were used during the observation period, which in itself points to possible differences in the diagnostic criteria. However, a supplementary list of all cases treated in Croatia's psychiatric hospitals was made, and CPR data checked and supplemented after inspection of individual patients' entire register files, done in another study (Kulčar *et al*, 1983). In the process, diagnoses made according to ICD-7 criteria were checked according to ICD-8, and no anomalies were discovered. Since there is no major difference between the eighth and ninth revision as far as the diagnostic criteria for schizophrenia are concerned, changes in diagnostic criteria did not influence the recorded incidence admission rates.

Secondly, the period was also marked by significant changes in the psychiatric service, and these mainly consisting of increased numbers of hospital beds, more manpower, and improved accessibility for the population, as well as more modern therapeutic procedures. Predictably, this generated a rise in the number of schizophrenics in psychiatric treatment, a shorter stay in hospital, and a greater frequency of admissions.

Thirdly, the statistics also reflect schizophrenic case identification in the community. Thus, an endogenous psychosis screening of a representative sample of Croatia's population aged 20-64, encompassing 23 754 subjects (Kesić *et al*, 1981) showed that 16% (0.55 per 1000) had not been admitted to hospital. Of those not admitted, only 7.7% were being treated as out-patients by a psychiatrist, the remainder having had no contact with the psychiatric service despite some of them suffering from schizophrenia for over 20 years. The female non-admission rate was three times the male rate. The male and female prevalence rates for

schizophrenia were about equal at the time, indicating that schizophrenic females are less likely to be admitted than males (Folnegović-Šmalc *et al*, 1980), which was reflected in the slightly lower admission incidence for females in this study. During the subsequent seven-year follow-up (Kesić *et al*), a third of the non-admitted patients were found to have been hospitalised.

Fourthly, a number of untreated and undiagnosed schizophrenics persist in the community. The psychiatric service's development has definitely improved detection of schizophrenics in the community, and this would tend to increase the hospital incidence rates.

Developments in out-patient care could have resulted in an increase in the number of schizophrenics not being admitted, but because of the insufficiency of out-patient care in Croatia, admission is indispensable at the acute stage of the disease. The absence of private psychiatric practice in SR Croatia therefore leads to all psychiatric cases being covered by the CPR eventually.

The hospital incidence rate is also prone to errors through misdiagnosis. The findings from the epidemiological study of Kulčar *et al* (1983) indicate the extent of this phenomenon. An evaluation of CPR diagnoses was made through a psychiatric field examination and by a follow-up of a representative sample of schizophrenics from the CPR framework. Unlike in the patient group with two or more admissions (Folnegović *et al*, 1984) where the diagnosis of schizophrenia was unconfirmed in a mere 1.3% of the cases, the rate in the single-admission patient group was as high as 27.9%, suggesting that CPR diagnosis does not differ much from its field rediagnosis in multiple-admission patients. Since readmissions are increasingly common, the number of misdiagnosed patients diminishes, owing to improved diagnostic procedures and psychiatric

training. More significantly, this would decrease the number of CPCR-recorded incidence admissions for schizophrenia.

The more complete identification of schizophrenics in the community and the improving diagnostic process have a mutually nullifying effect on the hospital incidence rate; the reported rates therefore reflect the incidence of schizophrenia in the population. This suggests that the genuine incidence rate of schizophrenia in Croatia's population has not changed significantly.

In contradistinction to our population findings, literature reports have also shown decreased hospital incidence rates in particular populations. Thus Hare (1974) indicated a drop in Ireland's schizophrenic incidence, accounting for it primarily by the association between the improvements in the population's nutritional and social conditions and schizophrenia's putative viral aetiology. Eagles & Whalley (1985)

suggested that there had been a significant fall in the number of schizophrenic first admissions in Scottish mental hospitals from 1969 to 1978. They inclined to the interpretation that the decrease in schizophrenic first admissions derived from a decrease in that population's genuine incidence rate for schizophrenia.

Over 1970–84, a decrease in the number of first-admission schizophrenics was also reported in Denmark. In interpreting it, Strömberg (1987) opted for the thesis that the changes could have resulted from the modern treatment and care provided for schizophrenia.

The diversity of data on incidence rates in particular populations over the past few decades imposes the need not only for further and longer follow-ups and the use of more uniform diagnostic criteria, but also for epidemiological studies in particular populations.

Acknowledgement, references, and authors' details will be found at the end of the third paper, pp. 371–372.

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## Characteristics of Male and Female Schizophrenics at First Admission

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Based on information from a case register, patient age and diagnosis at first admission are analysed in a Croatian cohort of schizophrenics first admitted in 1972 and followed up through the register for 12 years. Diagnosis was analysed on the same basis and over the same period. Although the male and female differences in incidence rates for schizophrenia were not large, hospital incidence rates in younger age groups were higher in males. Males were also more commonly diagnosed as schizophrenic at first admission, females more frequently receiving diagnoses of affective psychosis and other organic psychosis, except for alcohol-induced psychosis.

In studies of the incidence of schizophrenia, the type of information most often employed is first-admission rates to in-patient institutions. Potential information sources on smaller populations are an institution's medical records (Weeke *et al*, 1986) and targeted epidemiological studies (Cooper *et al*, 1987); for larger populations use is made of routine

statistics (Ødegaard, 1952) and case registers (Wing, 1986).

The case register is one of the basic research tools in psychiatric epidemiology (Brooke, 1974; ten Horn, 1983, 1986; Jennings, 1985). Follow-up studies using psychiatric case registers have also been incorporated in the World Health Organization's mental health