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, Strömgren (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

Z. FOLNEGOVIĆ, V. FOLNEGOVIĆ-ŠMALC and Ž. KULČAR

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

programmes (Gulbinat & Henderson, 1986). Special emphasis has been placed on the need to use the registers in practical work, as an incentive for research, as a means of co-ordination, and for the international exchange of information between centres keeping such registers.

An important factor in research into the aetiology of schizophrenia is the knowledge of disease incidence rates and case characteristics at first admission in different populations. Information from the Psychotic Case Register of Croatia (PCRC) on sex, age, and diagnosis of Croatia's schizophrenics at first admission, is presented and analysed in this connection.

Method

The results of this work are based on data extracted from the PCRC, a register established in 1962 at the Institute of Public Health of SR Croatia (see previous paper, this issue, pp. 363–365). The attending physician records the principal diagnosis, other psychiatric and somatic diagnoses, and, where appropriate, cause of death.

From 1962 to 1971 only those receiving a diagnosis of schizophrenia (300, ICD-6; 295, ICD-7,8) were recorded by the PCRC, whereas from 1972 to 1974 all psychotic first admissions (290, 292–299, ICD-8) except alcohol-induced psychosis (291, ICD-8) were entered. After 1974, it has been recording all admissions diagnosed as functional psychosis (295–299, ICD-8,9).

In 1972 the PCRC was extended to include a 'summary diagnosis'. This is a diagnosis based on a search through all the diagnoses made during PCRC-recorded admissions; it takes into account the chronological order of the individual diagnoses, co-occurrence of psychiatric and somatic diagnoses, and patient age and sex, etc. (Folnegović *et al*, 1984). The summary diagnosis thereby gives a single diagnosis for those patients given varying diagnoses on different admissions. In each case the summary diagnosis is established by CPRC's psychiatric collaborator who, where necessary, demands further information from the treating institutions and gathers such data as he considers relevant.

For the purposes of the present study, a special databank was set up, comprising a case cohort with the summary diagnosis of schizophrenia and a first admission in 1972. Accordingly, the cohort also included patients with a diagnosis on first admission other than schizophrenia, but who received a summary diagnosis of schizophrenia during the 12-year follow-up.

Sex, age, diagnosis, and diagnostic process were analysed. The diagnostic process was related to the number of readmissions and the interval between first admission and the admission at which schizophrenia was diagnosed.

Results

In 1972 incident schizophrenic admissions in Croatia totalled 1318 (622 male, 696 female). The age-standardised hospital incidence rates were 0.34 and 0.32 per 1000 inhabitants aged over ten for males and females, respectively. While the average male age at first admission was 33.7 ± 12.4 years, females were 5.5 years older.

Differences were also noted on comparing male and female age-specific hospital incidence rates (Fig. 1). Whereas in the younger age group hospital incidence rates for schizophrenics were higher in the male population, in the female population they were higher in the older age groups. Male and female differences were also manifested in relation to the diagnosis recorded at first admission (Table I).

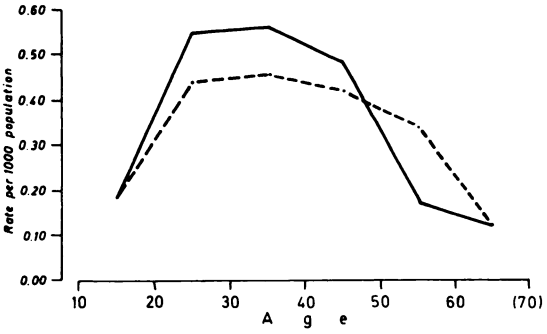

FIG. 1 Age specific incidence rates for schizophrenia (based on admission rates) in 1972 for Croatia, by sex (—— male, ---- female).

Within the observed diagnoses, the diagnosis of schizophrenia was significantly more common in males; in females, however, the diagnoses of affective psychosis and other organic psychoses were more frequent.

Male and female age distributions by individual diagnosis at first admission were also compared with regard to age (Table II). Females were signiciantly older than males only in cases diagnosed schizophrenic or unspecified psychotic at first admission. Conversely, there were no significant

TABLE I
Pattern of diagnoses at first admission in 1972 for Croatia's schizophrenics, by sex

ICD-8 code[1]	*Diagnosis*	*% male (n = 622)*	*% female (n = 696)*
291	Alcoholic psychosis	—	—
290, 292–294	Other organic psychoses	2.3	4.5*
295	Schizophrenia	65.0	56.6**
296	Affective psychoses	4.8	9.9**
297	Paranoid states	9.6	9.9
298	Reactive psychoses	2.4	3.3
299	Unspecified psychoses	15.9	15.8

χ^2 test: $*P<0.05$; $**P<0.01$.
1. World Health Organization (1967).

TABLE II
Average age of schizophrenics at first admission in Croatia in 1972, by diagnosis and sex (means ± s.d.)

ICD-8 code	*Diagnosis*	*Mean age at first admission male*	*female*
290, 292–294	Other organic psychoses	40.4 ± 16.3	41.0 ± 16.0
295	Schizophrenia	33.6 ± 12.5	37.5 ± 13.2*
296	Affective psychoses	39.3 ± 13.1	42.4 ± 14.0
297	Paranoid states	38.2 ± 10.4	39.5 ± 11.6
298	Reactive psychoses	27.3 ± 5.9	29.1 ± 10.0
299	Unspecified psychoses	30.9 ± 10.5	35.1 ± 11.9*

Student's *t*-test: *$P<0.01$.

differences in the age at first admission of males and females diagnosed with any other psychosis.

Sex differences with regard to the diagnosis at first admission were also manifested in the diagnostic process. The process of diagnosing schizophrenia was the longest in females, principally among those diagnosed at first admission with affective psychosis (296, ICD-8), where there was an average of 5.3 years between first admission and the diagnosis of schizophrenia on a subsequent admission; they also had an average of 3.5 readmissions. Among males, a significantly longer process of establishing schizophrenia was noted only for those receiving a diagnosis of reactive psychosis (298, ICD-8) at first admission.

Discussion

Like PCRC data, those from epidemiological studies also indicate the constancy of the incidence rate of schizophrenia in the population of Croatia and its approximate equality in males and females over 1965–84 (previous paper, this issue). The findings that males are younger than females at first admission, and that male and female hospital-based incidence rates are higher in younger males and in the older women, are in agreement with other reports, for example that of Kaličanin (1975), based on the Belgrade Psychotics Case Register with information on in- and out-patients. A similar relationship has been reported by Strömgren (1987), who linked this to different age at onset.

There were also sex differences with regard to the diagnosis at first admission: 65% of males were diagnosed as schizophrenic at first admission, compared with 56.6% of females. The relationship found by Munk-Jørgensen (1985) on analysing a cohort of first-admission schizophrenics in Denmark in 1972 and on following them up for ten years was similar. He noted that 50% of males and 40% of females were diagnosed schizophrenic on first admission. The slightly more frequent diagnosis of schizophrenia at first admissions in Croatia is probably due to the PCRC not recording admissions for alcohol-induced psychosis and other psychotic disorders (alcoholism, drug dependency, neuroses, personality disorders, etc.). In this connection, Munk-Jørgensen (1987) suggested that, in practice, estimates of true hospital incidence for male and female schizophrenics so diagnosed at first admission should be augmented by 52% and 50% respectively.

Diagnosing schizophrenia, both at first admission and during a readmission, is subject to a number of subjective and objective factors, related to the clinical picture, form of disease, time before admission, length of hospital stay, presence of other psychiatric or somatic disease, etc. The psychiatrist's ability to accept standardised criteria for the diagnosis of schizophrenia could also be a factor. A schizophrenic process occasionally develops insidiously, and the diagnosis may not be completely clear-cut at onset, despite a manifest psychic decompensation. Therefore, diagnosis for some schizophrenics would take time. When faced with an obscure case at the early stage of schizophrenia Croatia's psychiatrists prefer to use another diagnosis. A relatively large proportion of unspecified psychoses results from this, explicable by the psychiatric attitude that a patient should be 'protected', and not labelled a schizophrenic.

Age at first admission is also important in the diagnostic process; schizophrenics with a diagnosis at first admission of organic psychosis, affective psychoses, and paranoid state are on average older, whereas those with a diagnosis of reactive psychosis and unspecified psychosis are on average younger than those having schizophrenia diagnosed at first admission. While organic psychoses and affective psychosis were more common diagnoses at first admission for females, that of schizophrenia was more frequent in males at that point. Thus the age difference between males and females was primarily due to the first-admission diagnoses of schizophrenia or unspecified psychosis, as there was no significant age difference between males and females for other psychoses.

Differences in the process of diagnosis in males and females were further manifested both in the number of admissions and length of time between first admission and the diagnosis of schizophrenia. The majority of readmissions and the longest interval occurred in females, and this in those with the first-admission diagnosis of affective psychosis. A reason for this might be that first-admission diagnoses of unipolar depression (296.2, ICD-8) and involutional melancholia (296.0, ICD-8) were more frequently made in females, whereas cyclic manic-depressive psychoses (296.3, ICD-8) were more so in males.

The present findings indicate that schizophrenic males and females differ not only with regard to age and diagnosis at first admission, they also differ with respect to diagnostic process. However, admission is known to be affected by many diverse factors. The practice in Croatia is for patients with manifest psychoses to be admitted: the main criterion then applied to such patients is the feasibility of providing out-patient medical and psychiatric treatment and/or social support either at an institution or home, which can be different for the two sexes. The recording of schizophrenic admissions also depends on information source, method of collection, and processing.

Although admission-based statistics, PCRC data included, point to a higher female age at first admission, the question of whether age differences between males and females at the time of disease onset are genuine is still hypothetical. Thus the question now posed is whether the characteristics derived from such hospital statistics in fact describe stages of the disease other than disease onset. In studying the aetiology of schizophrenia in relation to age at onset, epidemiological studies are required. Such a study is reported in the following paper (this issue, pp. 368–372).

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

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Age of Disease Onset in Croatia's Hospitalised Schizophrenics

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Age at onset was determined in a sample of 360 patients representative of the 8069 schizophrenics hospitalised in SR Croatia. The 95% confidence interval for mean age at onset was 22.9–26.7 years. The difference between males and females was not significant, unlike the age difference between the sexes reported for age at first admission for schizophrenia. Results may be influenced by attrition of the original population of patients.

Epidemiological studies of schizophrenia have increasingly emphasised (Strömgren, 1987) that hospital statistics have some deficiencies when used in studies of incidence rates of schizophrenia, particularly when describing the characteristics of cases. A number of factors, such as the level of development and accessibility of mental health services and patients' socioeconomic status, have been noted to affect admission rates. In view of the diversity of these factors, the validity of the cross-cultural comparability between populations has been questioned (ten Horn, 1986; Jennings, 1986). Differences in diagnostic processes and criteria may also be significant contributing factors (Häfner & an der Heiden, 1986; Sartorius *et al*, 1986; Sartorius, 1988). Thus, there is a justified emphasis on the need to supplement and correct hospital statistical data with epidemiological findings and from long-term