

## Is Schizophrenia Really on the Decrease?

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**Summary.** Directly age standardized rates of first admission schizophrenia in Denmark (1991: 5.1 million inhabitants) decreased significantly with a slope of  $-0.16$  and  $-0.13/100,000$  inhabitants fifteen years and above for males and females respectively from 1971 to 1991 when examined by help of the Danish nation-wide psychiatric case register in the Institute of Psychiatric Demography, Aarhus. A control for changes in diagnostic delay/changing diagnostic patterns does not affect the findings. Various nosological factors might cause the decrease, e.g. changing structure in organization of treatment facilities, decreasing number of beds (50% in Denmark during the period investigated) and correlated with this: increasing suicide rates among pretreatment schizophrenics, increasing rates of schizophrenics not yet diagnosed in shelters for homeless and in institutions for criminals. The decrease might be genuine. In connection with this the theories about damage to the fetus during the gestation period are briefly discussed.

**Key words:** Schizophrenia – First admission rates – Decrease – Case register Denmark

### Introduction

During the last two decades a decreasing first-admission rate of schizophrenic patients has been reported from various parts of the western world (Parker et al. 1985; Eagles and Whalley 1985; Dickson and Kendell 1986; Joyce 1987; Eagles et al. 1988; de Alarcon et al. 1990; Der et al. 1990; Folnegovic et al. 1990; Castle et al. 1991; Harrison et al. 1991).

Several surveys from Denmark support these findings and show a clear decrease in the rate of first-ever admission of both males and females (Munk-Jørgensen 1986; Munk-Jørgensen and Jørgensen 1986; Munk-Jørgensen 1987; Munk-Jørgensen and Mortensen 1992).

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We know from previous studies that approximately 50% of all schizophrenic patients are diagnosed schizophrenic only at an admission later than their first-ever admission (Munk-Jørgensen 1985).

This means that if an increasing number of schizophrenics are diagnosed something other than schizophrenia at first admission this will cause a decrease in rates which does not reflect a genuine decrease but a change in diagnostic practice. This source of error was rectified in a study by Munk-Jørgensen and Mortensen (1992), and the same method was used in the present up-date of that study.

In the present investigation we used the nationwide Danish psychiatric register as data source (Dupont 1983, Munk-Jørgensen 1991). Information has been reported to the electronic register about all psychiatric inpatient admissions in Denmark since April 1969 and about all daypatient admissions since April 1975. The calculations in the study were based on data about

- all first-ever in- or day-patient admissions to a psychiatric hospital or a psychiatric department in a general hospital within the period 1971–1991 with a diagnosis of schizophrenia at least once within the period.

Rates were calculated per 100,000 population aged 15 years and above directly standardized with age, and with the Danish population in 1991 as reference.

As the statistical method we used linear regression analyses of the standardized rates with 5% as significance level (Armitage and Berry 1987), weighted by the reciprocal variance of the directly standardized incidence rates (Breslow and Day 1987).

The total number of probands was 10,090.

Figure 1 shows age standardized rates of first-ever admission diagnoses of schizophrenia (ICD-8: 295). The slopes of the regression lines are  $-0.16$  per 100,000 inhabitants aged 15 years and above per year for males ( $P < 0.001$ ) and correspondingly for females  $-0.13$  ( $P < 0.001$ ). However, if only including the figures from the period 1987–1991, which is the period by which a former study (Munk-Jørgensen and Mortensen 1992) has been extended, the slopes for males are  $+0.43$  ( $P < 0.05$ ) and

for females  $+0.14$  (N.S.). It is noteworthy that the decrease in first-ever admission rates of schizophrenia seems to have stopped during the later years, turning into a significant increase for males.

In the calculations depicted in Fig. 2 we respected the hypothesis that the latest given diagnosis is the true one. Therefore, the first-ever admission schizophrenia rate is calculated on the basis of all patients diagnosed as schizophrenic at their latest admission initiated during a 5-year observation period counted from the first day of the first-ever admission. For each patient the rates were calculated by the year of first-ever admission. We also respected the hypothesis that the patients were schizophrenics in the whole course of illness including their first admission, irrespective of the diagnosis. This way of calculation, which, within a 5-year period of observation, corrects for changes in diagnostic habits, also shows a significant decrease in the rates. The slopes of the regression lines are  $-0.19$  for males ( $P < 0.001$ ) and for females  $-0.17$  ( $P < 0.001$ ). However, if only including the figures from the period 1982–1986, which is the period not covered by the former study by Munk-Jørgensen and Mortensen (1992), the slope for males is continuously decreasing with an almost unchanged slope  $-0.17$  (N.S.) and for females with a less steep decrease  $-0.06$  (N.S.).

When these figures are compared with the results shown in Fig. 1, it can be concluded that in the later years there is a possible change towards more patients diagnosed as schizophrenic at their first-ever admission. The same trend is not seen among patients first ever admitted in the period 1982–1986 but included because of a diagnosis of schizophrenia at their latest admission within a 5-year observation period.

As shown in Fig. 1 and 2, there are still more schizophrenic males than females identified as newcomers in the psychiatric hospitals, even though the overall tendency is a decrease in rates for both sexes and a possible arrest of the decrease during very recent years.

A previous analysis showed that in males the decrease in first-ever admission diagnosis of schizophrenia is almost exclusively due to reduced rates in the age group 15–24 years while in females more age groups are involved, however, with a minor predominance among the middle-aged (Munk-Jørgensen and Jørgensen 1986).

Does the decrease in rates express a genuine decrease in the population or is it an artefact? This question has been widely discussed especially following Der et al's (1990) article in the *Lancet*. The discussion was summarized by Angst (1991) and further commented on by Mortensen et al. (1991) and in a specific thorough way by Häfner and Gattaz (1991).

As mentioned, changing diagnostic practice might be a partial explanation of the decrease in schizophrenia first-ever admission rates due to an increased popularity of classifying schizophrenics something other than schizophrenia. In a previous study, we showed that alternative diagnoses as, for instance, paranoid states, especially borderline states, or manic depression were increasingly used instead of schizophrenia (Munk-Jørgensen 1987; Mors 1988). The method used in the present study (Fig.

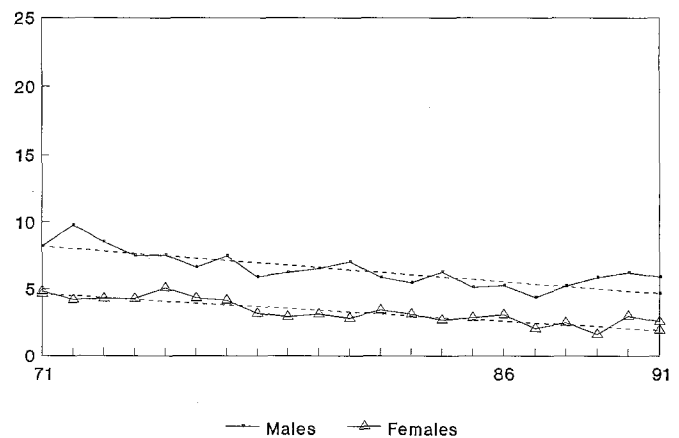


Fig. 1. Schizophrenia diagnosis at first-ever admission

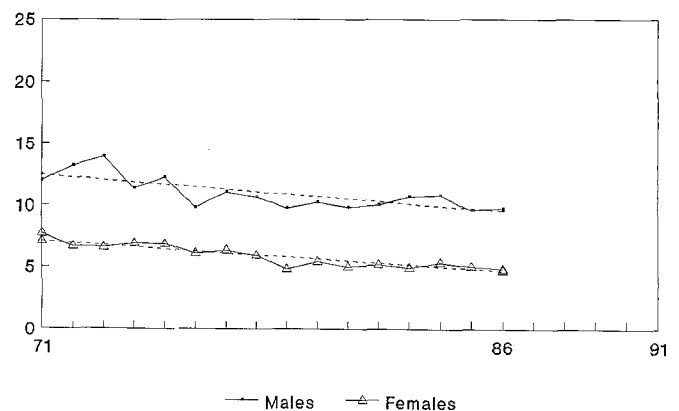


Fig. 2. Schizophrenia diagnosis at the latest admission within a 5-year observation period

2) would count the patient as schizophrenic if he or she was given the diagnosis at the latest admission during a 5-year observation period, irrespective of the diagnosis at first admission. In other words the method presented will reduce the effect of a changing diagnostic practice. If, however, one of the diagnoses mentioned above was used at each admission during the observation period the patient would, of course, not be included in the present study and would contribute to the decreasing rates of schizophrenia.

The hypothesis that better treatment facilities might explain the decrease in rates of schizophrenia as suggested by among others Dickson and Kendell (1986), by Joyce (1987), and by Parker et al. (1985) is still a possible explanation. If schizophrenics were diagnosed as, for instance, manics because of the response to lithium treatment this would cause a decrease in schizophrenia incidence, but a study from Camberwell by Castle et al (1991) has not been able to confirm this hypothesis.

Decreasing first-ever admission rates of schizophrenia might be part of a general trend. This hypothesis which seems to be one of the strongest is supported by a decreasing rate of the total number of first-ever admissions in Denmark irrespective of diagnosis (Munk-Jørgensen and Mortensen 1992).

Therefore, the most obvious explanation for the decreasing incidence of schizophrenia seems to be rearrangement of services of which the most marked change is a decrease in available beds. In Denmark the decrease has been of about 50% from the mid-1970s to 1990, when the bed rate was approximately 0.9 per 1,000 total population (Institute of Psychiatric Demography, annual reports 1976 and 1990).

This hypothesis is supported by the significant decrease in all diagnostic groups (except alcoholism and non-specified psychoses). Furthermore, the reduction in available beds has not been sufficiently supplemented by extension of community psychiatric service or any other in or outpatient treatment facilities.

The possibility that more patients were treated only in private psychiatric practice or in general practice has been considered but must be rejected. Also a suggestion of rise in emigration of schizophrenic patients can most probably be rejected (Munk-Jørgensen and Mortensen 1992).

But attention should be given to a possible group of never treated schizophrenics formed by:

- pretreatment suicides among schizophrenics
- increasing number of homeless schizophrenics
- increasing number of criminal schizophrenics not treated but found in Danish prisons and other similar institutions.

These are all to a certain degree sequelae to the changed, or so to say, reduced psychiatric service mentioned previously.

We have found a 100% increase in standard mortality rates among schizophrenic patients from the early 1970s to mid-1980s (Munk-Jørgensen and Mortensen 1992). Half of the deaths among the males and one third among the females were suicides (Mortensen and Juel personal communication). It is, of course, impossible to conclude on the basis of increasing standard mortality rates among patients already diagnosed as schizophrenic that standard mortality rates among patients suffering from schizophrenia but never diagnosed or treated as such are increasing. However, seen in the light of the reduced possibilities of admissions to psychiatric hospitals and wards during the last 15 years, the figures could show that there might be a coincidence between decreasing first-admission rates, excess mortality rates, and deinstitutionalization.

Increasing prevalence of mental disorders among the also increasing numbers of the homeless is described during the last decade especially from the US (Isaac and Armat 1990). We have also found a marked increase in Denmark. Brandt found 20% with psychotic disorders in a Copenhagen shelter in 1987, especially schizophrenia and borderline states (Brandt 1987). It is likely that homelessness is a contributory cause of the decrease in the first-ever admission rates. In a recent study, we found a prevalence of 8% of persons in the institutions for homeless previously diagnosed as schizophrenic, which is 15–25 times the prevalence in the general population (Munk-Jørgensen et al. 1992). So it might be likely that in these institutions there are a number of schizophrenics never diagnosed, especially males, who represent 90%

of the clients in the shelters (Munk-Jørgensen et al. 1992).

Within the last 1–2 years we have been informed of an increasing number of mentally ill patients, especially schizophrenics in Danish prisons and similar institutions, and there has been a 60% increase in the number of mentally ill criminals sentenced to treatment (Kramp in press). A nationwide study of the number of persons in Danish prisons formerly admitted to psychiatric hospitals and wards is being implemented.

A last explanation of the decreasing first-admission rates might be a genuine decrease in the population. This might be caused by a lesser virulence of the schizophrenic disease (Hare 1974). Some studies show that complications in pregnancy and birth (Parnas et al. 1982; McNeil et al. 1988) including infection of influenza in the second trimester (Kendell and Kemp 1989; Barr et al. 1990; Sham et al. 1992) might cause development of schizophrenia among predisposed persons. However, these theories are at the moment still at an explorative level and the findings are inconsistent as they are concerning the influenza hypothesis which has been discussed at e.g. the 1992 Badgastein workshop on schizophrenia (Crow et al. 1992; Torrey et al. 1992). Therefore, it cannot be denied that better control during pregnancy and birth and prophylaxis of infections during recent decades might have caused a decreasing incidence of schizophrenia, especially in Denmark where the Second World War and the post-war period did not cause the same suffering as in many other countries.

## Conclusion

First-ever admission rates of schizophrenia in Denmark have decreased since 1970. The most obvious explanation is the extensive restructuring of the psychiatric service of which a decrease in available beds of more than 50% seems to be most important. This hypothesis is supported by a decrease in first-ever admission rates in almost all diagnostic groups. However, a genuine decrease cannot be rejected. The decrease is of the same size among males and females. But still, more males than females are admitted with schizophrenia. The decrease in first-ever admission diagnoses of schizophrenia is mainly seen among younger males, while all age groups are represented among the females, although the most marked reduction is seen in the group of the middle-aged. In the last 4–5 years the decrease seems to have stopped.

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