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Is There an Increase of Reproductive Rates in Schizophrenics?

III. An Investigation in Nordbaden (SW Germany): Results and Discussion*

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Summary. Two cohorts of schizophrenic patients admitted to a psychiatric hospital for the first time either during 1949-50 or 1965–67 were compared with matched controls for reproductive rates before and 13 years after onset of psychosis. Patients of both admission periods had reduced marriage rates. After onset of the disease the rate of reproduction was decreased in males of both periods, but not in females. Patients of both periods did not differ from control values with respect to marital fertility. It has repeatedly been reported that fertility of schizophrenics has been increasing in recent times. Comparison of total reproduction, rate of marriage and marital fertility in patients of the two admission periods and matched controls did not yield any evidence for increasing rates. Instead, the results favour the idea that the patients parallel at a lower level the general decline of birth rates observed in Western Germany.

Key words: Fertility - Schizophrenia - Reproductive rates - Marriage rates

Zusammenfassung. An zwei Kohorten schizophrener Patienten, die entweder 1949–50 oder 1965–67 erstmals stationär behandelt worden waren, wurde die Reproduktivität im Vergleich zu parallelisierten Kontrollen präpsychotisch und während eines 13jährigen postpsychotischen Zeitraums bestimmt. Die Patienten beider Aufnahmeperioden zeigten herabgesetzte Heiratsraten. Postpsychotisch war die Fortpflanzungsrate männlicher Patienten beider Kohorten reduziert, nicht jedoch bei weiblichen Patienten. Die eheliche Fertilität unterschied sich in beiden Perioden nicht signifikant von der der Kontrollen. In der Literatur ist mehrfach eine Zunahme der Fertilität Schizophrener beschrieben worden. Diese Untersuchung lieferte keine Hin-

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weise dafür, daß die totale Reproduktivität, die Heiratsrate oder die eheliche Fertilität bei schizophrenen Patienten zwischen beiden Aufnahmezeiträumen zugenommen hat. Vielmehr läßt die Untersuchung den Schluß zu, daß die Geburtenrate schizophrener Patienten der der Allgemeinbevölkerung auf einem niedrigeren Niveau folgt.

Schlüsselwörter: Fertilität - Schizophrenie - Reproduktivität - Heiratsraten

Introduction

The methodological design of an investigation on reproductive rates of schizophrenics has been described in a preceding paper (Propping et al. 1983). Earlier investigators examined fertility of schizophrenic patients either at a given point in time, or they compared separate periods of time in order to look for possible trends of fertility as compared with the general population. The methodological factors that influence the observed measures of reproductivity and may be responsible for differences between the studies were discussed earlier (Haverkamp et al. 1982). In this study, fertility of two cohorts of schizophrenic patients (first ever admission either 1949–50 or 1965–67) was compared with matched controls. Therefore the methodological design of this investigation is comparable with studies on eventual changes of reproductivity of schizophrenic patients over time (Table 2 in Haverkamp et al. 1982), such as the investigation by Ødegard (1960) or Erlenmeyer-Kimling et al. (1969).

Results

1. Total Reproduction, Marriage Rate, and Marital Fertility

The rates of total reproduction as measured by mean number of births per person broken down according to the prepsychotic or postpsychotic periods of the patients are given in Table 1. In order to obtain the corresponding reproductive rates of the controls, the same time pattern of the disease course was individually applied for each matched control person. The postpsychotic period of 13 years was chosen to make the cohorts of patients comparable in this respect.

For examining mean number of children per person statistically, comparison of mean scores by a X^2 test (Cochran 1954) was used, where the persons of both samples are scored by the number of children. Neither before nor after onset of the psychosis did the reproductive rates of female patients differ significantly from those of the control subjects.

In both healthy and sick males, the reproductive period is distributed over more years than in females. Male schizophrenics of the two patient cohorts had significantly lower reproductive rates than the controls during 13 years after the first hospital admission (Table 1). The significantly increased prepsychotic reproductive rate of male patients from the earlier admission period is due to a few outliers with unusually high birth rates. Altogether the total reproductive rates of

Table 1. Total reproduction: mean number of births per person of schizophrenic patients and controls according to admission period, reference period and sex.

Reference period	Admission period							
	1949–50				1965–67			
	Males		Females		Males		Females	
	Patients $n=62$	Controls $n=62$	Patients $n=121$	Controls $n=121$	Patients $n=82$	Controls $n=82$	Patients $n=146$	Controls $n=146$
Prepsychotic	0.70*	0.35	1.04	0.89	0.35**	0.78	1.00	1.10
Postpsychotic t 13	0.64*	1.13	0.23	0.41	0.27**	0.66	0.14	0.27
Postpsychotic>t 13	0.09	0.24	0.02	0.03	0.00	0.02	0.00	0.00
Total	1.43	1.72	1.29	1.33	0.62**	1.46	1.14	1.37

** $P<0.01$; * $P<0.05$

Table 2. Proportion of childless patients and controls according to admission period and sex.

	Admission period	
	1949-1950	1965-1967
Males		
Patients	48% ($n=30$)*	71% ($n=58$)**
Controls	26% ($n=16$)	32% ($n=26$)
Females		
Patients	44% ($n=53$)	43% $n=63$)
Controls	41% ($n=49$)	36% ($n=52$)

** $P<0.01$; * $P<0.05$

Table 3. Proportion of patients and controls ever-married according to admission period and sex

	Admission period			
	1949-1950		1965-1967	
	Patients	Controls	Patients	Controls
Males	66%** ($n=41$)	93% ($n=58$)	39%** ($n=32$)	82% ($n=68$)
Females	65%** ($n=79$)	81% ($n=99$)	68%* ($n=100$)	81% ($n=119$)

** $P<0.01$; * $P<0.05$

male patients and controls do not differ significantly. The proportion of childless patients however differed significantly between male patients of the two cohorts and their respective controls, but not in female patients (Table 2).

An important predictor of total reproduction is the rate of marriage. Schizophrenics have been well known to have lower marriage rates than the general population. This is also reflected in our sample: patients of both sexes have significantly lower marriage rates than controls, particularly the males (Table 3).

As to marital fertility, the mean number of births per person did not differ significantly between the patients of the two admission periods and their respective controls, neither before nor after onset of the psychosis (Table 4). In females in particular the majority of births were observed in the prepsychotic period.

If only fertile marriages are considered, a similar pattern emerges. The mean number of children per person is: (admission 1949-50) patients/controls 2.82/2.32 for males and 2.31/2.25 for females; (admission 1965-67): patients/controls 1.82/2.12 for males and 2.06/2.17 for females. The proportion of childless marriages decreased sligthly between the two periods, both for patients and controls.

The number of illegitimate births, although a little higher in female patients than in controls, is small (1949-50: 7/2, 1965-67: 7/5 for patients/controls, respec-

Table 4. Marital fertility: mean number of births per person ever-married (schizophrenics and controls) according to admission period, reference period and sex

Reference period	Admission period							
	1949-50				1965-67			
	Males		Females		Males		Females	
	Patients $n=41$	Controls $n=41$	Patients $n=79$	Controls $n=79$	Patients $n=32$	Controls $n=32$	Patients $n=100$	Controls $n=100$
Prepsychotic	1.07	0.76	1.49	1.30	0.94	1.13	1.40	1.54
Postpsychotic t 13	0.98	0.78	0.34	0.19	0.71	0.55	0.20	0.21
Postpsychotic>t 13	0.12	0.27	0.03	0.03	0.00	0.03	0.00	0.00
Total	2.17	1.80	1.86	1.52	1.65	1.71	1.60	1.75

Table 5. Rates of total reproduction, marriage rates and marital fertility of males and females in the two admission periods, expressed as percentages of expected values

	Admission period	
	1949–1950	1965–1967
Total reproduction		
Males	83%	42%
Females	97%	84%
Rate of marriage		
Males	71%	48%
Females	80%	84%
Marital fertility		
Males	120%	96%
Females	120%	91%

tively). The differences between patients and controls are not statistically significant. In males information on illegitimate births could not be obtained reliably.

The essential question of this investigation was whether reproductive rates of schizophrenics have increased in recent times. Due to the long-term changes of reproduction in the general population, reproduction rates in patients of the two periods cannot simply be compared. Instead, fertility of the patients has to be related to the control values of the same period. For this purpose, the reproductive measures were expressed as proportions of the expected values derived from the control data (Table 5). The rate of reproduction relative to the control values decreased more in male than in female patients from the first to the second admission period. This was mainly due to a decline of marriage rates in males. Marital fertility, on the other hand, exhibits only a slight decrease.

When examining changes of the reproductive measures over time for statistical significance the age distribution has to be taken into account. Within each of three age groups (16–30, 31–40, 41–55 years) the number of children of each patient was expressed as a percentage of the mean control value.

These relative values of both admission periods were examined for a difference by the Mann-Whitney *U*-test. For none of the reproductive measures (Table 5) did the change prove to be significant, although the significance level was approached for the total reproduction rate in males ($P=0.1$). The failure to achieve statistical significance is due to some male schizophrenics of the earlier admission period who had an unusually high number of children; these males are responsible for the relatively high mean proportion of 83%.

The changes in the rates of marriage between periods were examined for statistical significance by Woolf's X test: The ratio of patients and controls among the married persons is compared between both periods after age standardization. The X values obtained for each age group are combined to give an overall X value. In neither sex did the changes prove to be statistically significant.

2. Fertility Relative to Age at First Admission, Number of Hospital Admissions, and Subtypes of Schizophrenia

In a more detailed analysis the influence of certain factors related to the disease process on reproductive measures was examined. Since the prognosis of early-onset schizophrenics is, on average, poorer than that of late-onset patients, it was hypothesized that the former will remain unmarried more frequently and therefore have fewer children than the latter. The age of 30 years was chosen as the cut-off point because approximately half of all schizophrenics have developed the disease by this age (Huber et al. 1979). In fact, schizophrenics with hospital admissions before the age of 30 years tended to have less children than those with first admissions when older than 30 years. The difference however, was statistically significant only for males of the earlier admission period (Cochran's X^2 test, see above) (Table 6). For the 1965–67 cohort the difference between the age groups for males was only significant at the 0.1 level.

Another factor that may influence reproductive measures is the number of hospital admissions, there being less children in patients with more frequent admissions. Patients who were admitted only once were compared with those who underwent multiple hospitalizations. Approximately one-third of all schizophrenics have been known to be admitted only once (Huber et al. 1979).

Table 6. Mean number of children per schizophrenic patient according to admission period, sex, and age at onset. In both periods, one female is missing

Age at first admission	Admission period			
	1949–1950		1965–1967	
	Males	Females	Males	Females
< 30 years	0.83*	0.81	0.32	0.73
	(n=36)	(n=36)	(n=44)	(n=45)
> 30 years	1.88	1.24	0.71	1.20
	(n=26)	(n=84)	(n=38)	(n=100)

Table 7. Mean number of children of age-standardized schizophrenic patients according to admission period, sex and number of hospital admissions

Frequency of hospital admissions	Admission period			
	1949–1950		1965–1967	
	Males	Females	Males	Females
One hospital admission	1.71*	1.29	0.35	1.00
	(n=21)	(n=45)	(n=20)	(n=60)
Multiple hospital admissions	1.07	1.00	0.55	1.09
	(n=41)	(n=75)	(n=62)	(n=85)

* $P < 0.05$

Table 8. Mean number of children of paranoid and non-paranoid patients standardized for age according to admission periods and sex

Diagnostic subtypes	Admission period			
	1949–1950		1965–1967	
	Males	Females	Males	Females
Paranoid	1.14 ($n=36$)	1.11 ($n=55$)	0.51 ($n=41$)	1.14 ($n=109$)
Non-paranoid	1.04 ($n=26$)	1.15 ($n=65$)	0.49 ($n=41$)	0.81 ($n=36$)

Male patients of the earlier period with multiple hospital admissions had significantly less children than those with only one admission (Table 7). In the later of the two periods several patients admitted only once were hospitalized for nearly the whole follow-up, and this may have led to the unusually low fertility rate in these patients. In both admission periods fertility of female patients proved to be largely independent of the number of hospitalizations.

Kallmann (1938) reported the marital fertility in paranoids to be considerably less reduced than in other subtypes, and Scharfetter and Nüsperli (1980) made a comparable observation. Our study showed only a slight trend in this direction, but did not find a significant difference between the birth rates of paranoid and nonparanoid patients (Table 8), the latter group comprising disorganized (hebephrenic), catatonic, undifferentiated, and residual forms of schizophrenia according to the criteria of Spitzer et al. (1975). Note that the diagnostic classification was done only once at first admission, the further course of the disease was not considered.

Discussion

Since the pioneering investigation of Essen-Møller (1935) it has been known that schizophrenics, when compared to the general population, have a reduced fertility rate. The present study was undertaken in order to examine whether reproductive rates of schizophrenics have increased in recent times, as reported by some authors. In two cohorts of schizophrenic patients who had been defined on an epidemiological basis as first ever admissions either in the period 1949–50 or 1965–67, there was no evidence for increasing fertility rates when the patients were compared with matched controls. Thus, changing therapeutic practice and the abbreviation of hospital stay have not led to higher birth rates in schizophrenics. Instead, the results favour the idea that schizophrenics parallel at a lower level the general decline of birth rates observed in West Germany.

If there is a trend at all in the reproductive rates of the two schizophrenic cohorts, it is a downward trend in males (Tables 1, 5). As mentioned earlier (Propping et al. 1983) some selection for severity in the male admissions of the later period appears possible. This assumption is supported by the following argu-

ments: the annual incidence rate of male first admissions decreases from the earlier to the later period, whereas the proportion of unmarried males and the duration of their first admission increases. Possibly, in 1965–67 not all of the less severe male cases were admitted to hospital, some may have been treated as outpatients. In the female patients, on the other hand (Tables 1, 5), marriage rate and rate of reproduction were similar in the two periods.

In agreement with earlier investigations (Haverkamp et al. 1982), this study confirms a reduced marriage rate in schizophrenics which in turn is mainly responsible for the reduced total rate of reproduction, particularly in males. Marital fertility, on the other hand, is not decreased. As already described by others (e.g. Essen-Møller, 1935) fertility is less reduced in the prepsychotic than in the postpsychotic period. Obviously, this is also mainly due to the marital status of the patients.

Erlenmeyer-Kimling et al. (1969) found an increase of ever-married schizophrenics and a decrease of childless marriages between 1934-36 and 1954–56. For various reasons we were unable to observe such trends in our investigation. Essen-Møller (1935) had already observed that when general birth rates are decreasing, fertility of schizophrenics lagged behind the population trend. Possibly the New York study was influenced by this phenomenon. In the American study the change in living conditions might have been more pronounced between the two admission periods that were interrupted by the war. It is also possible that the use of census data for control purposes influenced the data of Erlenmeyer-Kimling et al. because it is difficult to control racial or sociocultural factors in this procedure.

This study cannot offer explanations for the mechanisms by which the reproduction of schizophrenics is influenced. At least some of the following factors may have been present: conscious decisions of the patient, influence of the *Zeitgeist* with respect to reproductive decisions, availability of reliable contraceptive methods, counselling by the psychiatrist, or even temporary sterility as a direct influence of neuroleptic drugs. It would be of interest to examine these influences in greater detail.

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