Arch Psychiatr Nervenkr (1983) 233 : 167–175

Archiv für Psychiatrie und Nervenkrankheiten
Archives of Psychiatry and Neurological Sciences

Is There an Increase of Reproductive Rates in Schizophrenics?

II. An Investigation in Nordbaden (SW Germany): Methods and Description of the Patient Sample*

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Summary. For an investigation on the question of whether fertility rates of schizophrenics have been increasing in recent times, two cohorts of patients were defined on an epidemiological basis. The patients were first admissions during either 1949–50 ($n=183$) or 1965–67 ($n=228$). The conditions of case definition as well as their demographic and psychiatric characteristics are described. These data are necessary for the evaluation of reproductive rates observed in the patient sample. Furthermore, the two cohorts of patients may be of general interest, because they comprise patients first admitted to a hospital who were completely ascertained in a certain region and time period. They reflect certain changes in hospitalization practice in Germany.

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

Zusammenfassung. Es wurde eine Untersuchung über die Frage durchgeführt, ob die Fortpflanzungsrate schizophrener Patienten in jüngerer Zeit angestiegen ist. Hierfür wurden zwei epidemiologisch definierte Kohorten von Patienten gebildet, die entweder 1949–50 ($n=183$) oder 1965–67 ($n=228$) erstmals hospitalisiert worden waren. Es werden die Kriterien der Falldefinition sowie die demographischen und psychiatrischen Charakteristika der Stichproben beschrieben. Diese Angaben sind für die Beurteilung der Fertilitätsparameter notwendig. Die beiden Patienten-Kohorten sind darüberhinaus von allgemeinerem Interesse, weil es sich um ein in einer bestimmten Zeit und Region vollständig erfaßtes Kollektiv erstmals hospitalisierter Patienten handelt, das gewisse Änderungen der Hospitalisierungsgewohnheiten in Deutschland widerspiegelt.

Schlüsselwörter: Schizophrenie – Fertilität – Reproduktivität – Heiratsraten

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* Supported by Deutsche Forschungsgemeinschaft within the SFB 116

Introduction

The aim of this investigation is to attempt to answer the question whether fertility rates of schizophrenic patients have been increasing in recent times as compared to the general population.

In a preceding review (Haverkamp et al. 1982) it was shown that the evidence for increasing rates of fertility in schizophrenics is at best based on one study (Erlenmeyer-Kimling et al. 1969). Because of the continuing interest, both from the theoretical and practical point of view, an investigation on the problem of increasing fertility rates in schizophrenics was performed. Particular attention was paid to methodological aspects, because case definition of patients and controls can bias the fertility rates measured. Cases were therefore defined as all first hospital admissions in a given region and time. Controls were obtained by individual matching.

1. Design of the Investigation

If there in fact exists an increase in fertility rates in schizophrenic patients in recent times, this increase should have been favoured by the more liberal and more effective therapy of psychotic patients that was made possible by the introduction of neuroleptics in the 1950s. Therefore, taking into account epidemiological criteria, samples of schizophrenic patients from two admission periods were selected: one before (1949–50) and one after (1965–67) the introduction of neuroleptic drugs in psychiatric therapy. During these periods, all first admission patients either to the Psychiatric Clinic of the University of Heidelberg or to the Psychiatrische Landeskrankenhaus Wiesloch with the diagnosis of schizophrenia were taken as index cases for this investigation. The two cohorts of patients were then examined longitudinally with respect to marriage, fertility and course of the disease. Further conditions for inclusion were that the patients lived in one of three districts (Heidelberg, Mannheim, Rhein-Neckar-Kreis) of Nordbaden (SW Germany), that they were in the age range between 16 and 55 years, and had German nationality.

Requirements for Case Definition

Residence. The definition of residence is necessary in order to avoid selection of certain patients, a phenomenon well-known for university clinics. The ascertainment of the schizophrenic patients is fairly complete. Only those patients who although residing in one of the districts, were admitted to a hospital outside the region have evaded detection. There were, however, no hospitals in the vicinity that might have competed for patients. Our residential region contains urban as well as rural parts. By and large, it may be regarded as representative of the population structure of West Germany.

Admission Periods. The period 1949–50 was the earliest possible after the war. The inclusion of earlier years could have led to influences beyond empirical control. The years 1965–67 were chosen in order to obtain a sufficiently long follow-up period. Although the patients admitted 1949–50 may have been treated with neuroleptics later, they were undoubtedly treated less intensively with neuroleptics and therefore in a more restricted way than those admitted in the second period.

Clinics. The hospitals in Heidelberg (University Clinic) and Wiesloch (State hospital) were the only psychiatric institutions in the region of Nordbaden during the relevant years.

Admission. Only first admissions with the diagnosis of schizophrenia were included, omitting patients who had been hospitalized earlier either in the same or in another clinic.

Diagnosis. The clinical diagnosis of schizophrenia had to be made at the occasion of the first admission. However, the diagnoses were controlled for validity according to the criteria of Spitzer et al. (1975) by reviewing the patients' records. The interrater reliability of this procedure had previously been tested in a pilot study and had proved to be high (Kappa = 0.81). Furthermore, the number of cases with the possible diagnosis of schizophrenia which may have been missed was checked. Among 55 patient records with clinical diagnoses that might at first glance have justified the diagnosis of schizophrenia (psychopathy, abnormal reaction, neurotic development, mania) only 4 proved to merit Spitzer's criteria "probable schizophrenic". Therefore we can presume that the number of escaped cases was very low.

Age. Patients with an age greater than 55 years at first admission were excluded in order to exclude eventual senile psychoses.

Data collection. When reviewing the patients' records, the following data were extracted: date and location of birth, marital status, religion, eventual date of birth of any children, number and duration of further hospitalizations. If a patient is admitted to another clinic, the clinic requests the patient's record of his earlier hospitalization. This request is stated in the record. Thus, the complete hospital career of a patient is fairly reliably known. Hospitals outside the region were asked to deliver the same information as that extracted from the first admission record. Furthermore, the registration offices of the patients' residences were contacted and asked for information on marriage and birth dates of a patient's children.

Since the periods that can be analysed after onset of the psychosis differ between the two cohorts, a standard reference period of 13 years was defined for every patient. Thus, for comparisons between both cohorts, only fertility during equal time periods was taken into account. In most female patients this period covers nearly the whole fertile period. This may be illustrated by an "extreme" case: if an 18-year-old female was admitted to the clinic 1967, she was 31 years old by the end of 1980. According to the official statistics of the Federal Republic of Germany, 31-year-old women have already given birth to 82% of the total number of children. If a women was older at her first admission, the obtained fertility approaches nearer to her total fertility. In males, the fertile period is longer; however, there are no official statistics available that allow an estimate of the proportion of fertility ascertained in the males.

2. Description of the Patient Sample

The aim of the study was to ascertain completely all the cases who had been admitted to the two hospitals of the region during defined time periods. Table 1 gives the absolute numbers of schizophrenic patients who fulfilled the case definition according to the clinic where they were ascertained. Between the two periods a certain shift of first admissions from the university clinic to the state hospital took place. Only those patients who could be traced until 1980 were regarded as index cases. The high preponderance of female patients in this material cannot be explained by age structure and sex proportion of the residential population. A less pronounced preponderance of females among hospitalized patients, however, has been found by many authors.

Table 2 shows the distribution of the marital status, separately at admission and at the end of the follow-up period. The married, divorced, and widowed status were condensed to "ever-married" because the pattern of changes of marital status is too complex to be taken into account in the further analysis. As expect-

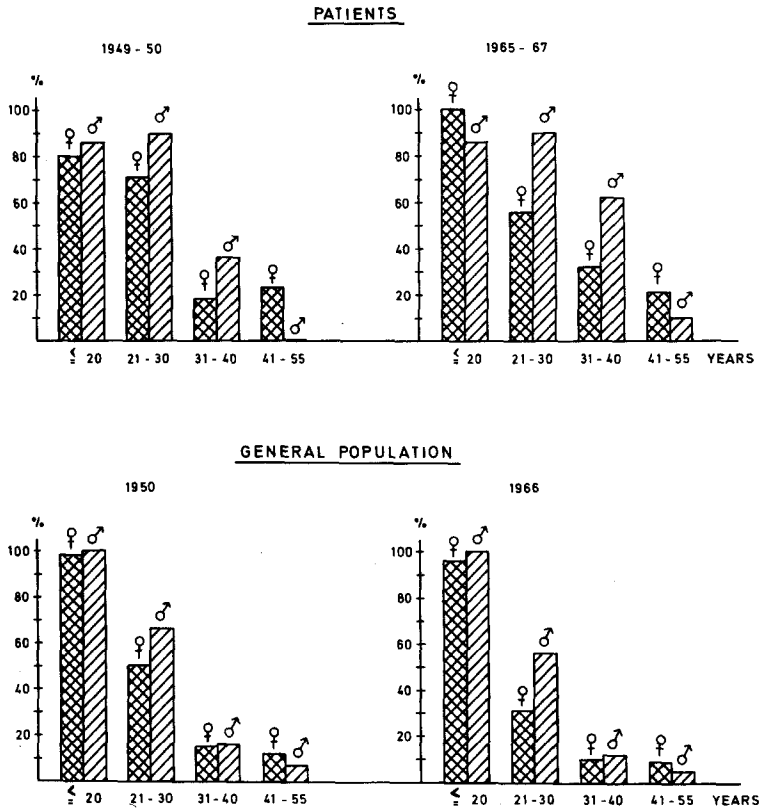

Fig. 1. Distribution of unmarried persons according to age in the two patient cohorts and in the general population of the Federal Republic of Germany (official demographic data, published in *Statistische Jahrbücher*)

Table 1. Number of first admissions with the diagnosis of schizophrenia who fulfilled the case definition in the two admission periods

	1949–50	1965–67
First ever admissions		
Heidelberg		
Males	66	23
Females	104	53
Wiesloch		
Males	4	62
Females	34	101
Total		
Males	70	85
Females	138	154
Traceable until Dec. 31, 1980		
Males	62	82
Females	121	146

Table 2. Marital status of the patients at admission and at Dec. 31, 1980

	1949–50	1965–67
At admission:		
Single		
Males	38	58
Females	45	57
Ever-married		
Males	24	24
Females	76	89
At Dec. 31, 1980		
Single		
Males	21	50
Females	42	46
Ever-married		
Males	41	32
Females	79	100

Table 3. Survey of all psychiatric and all schizophrenic admissions to the clinics in Heidelberg and Wiesloch, and of the schizophrenic first admissions who come from the three relevant districts

	1949–50	1965–67
No. of inhabitants in the 3 districts	668.470	845.267
Total number of admissions in both psychiatric institutions	6.872	13.225
Total number of schizophrenic admissions	2.007	4.355
Schizophrenic first admissions from the 3 districts	208	239
Incidence per year	0.16‰	0.09‰

Table 4. Age in years (mean ± s.d.) of the schizophrenic cases according to admission period, sex and marital status at admission

	1949–50	1965–67
Males:		
Single	24.86±4.67	27.42± 5.73
Ever-married	38.20±9.20	37.20± 8.96
Total	30.02±6.42	30.28±6.68
Females:		
Single	31.37±9.40	31.15±11.88
Ever-married	39.36±7.87	41.35± 9.82
Total	36.39±8.44	37.37±10.62

Table 5. Distribution of the 144 male and 267 female cases who could be traced until Dec. 31, 1980 according to the criteria of Spitzer et al. (1975) that were applied to the patients' records

	No. of cases			
	Males		Females	
	1949–50	1965–67	1949–50	1965–67
"Definite" schizophrenia	33	46	56	98
"Probable" schizophrenia	17	17	29	22
"Negative"	12	19	36	26
Total	62	82	121	146
Phenomenological subtypes:				
Paranoid	36	41	55	110
Disorganized (hebephrenic)	3	5	1	6
Catatonic	3	5	6	8
Undifferentiated	20	30	45	14
Residual	–	–	1	1
Unknown	–	1	13	7

ed, the proportion of single patients is appreciably higher among males. Figure 1 shows in a more detailed way the percentage of unmarried patients according to age and sex.

Table 3 gives a survey of the population size in the three districts chosen for the investigation and of the number of admissions to the two psychiatric clinics. As can be seen from the calculated incidence rate per year, there is a decrease of first admissions for schizophrenia in the second period.

Mean age of the patients of both admission periods according to sex and marital status is given in Table 4. Unmarried males are remarkably younger than females, a phenomenon well-known in the literature. With respect to religion and population size of the patients' residences, the patients resemble the general population of the Federal Republic of Germany.

Table 5 shows the results of the review of the records according to the criteria of Spitzer et al. (1975). The great majority of cases proved to fulfill the criteria of either definite or probable schizophrenia. Thus, the clinical diagnosis appeared to be fairly reliable. The subtype of schizophrenia was defined according to the predominating phenomenology during the first hospital admission using Spitzer's criteria.

In order to examine an eventual influence of hospitalization on fertility (Hilger et al. 1983), number and duration of the patients' hospital stays were examined with regard to their possible influence on fertility. There are certain consistent trends (Table 6a–c): The total duration of hospital stay decreases from the earlier to the later admission period both for males and females and is longer for single than for married patients in the two periods. From 1949–50 to 1965–67 the mean number of hospital admissions increases both for males and for females. The average duration per hospital stay decreases for females and

Table. 6a. Mean and range of total duration of hospital stay in days according to marital status, admission period, and sex during the standard reference period

	Males		Females	
	1949–50	1965–67	1949–50	1965–67
Mean				
Single	643.0	581.6	548.7	443.1
Ever-married	484.3	293.8	282.7	192.3
Range				
Single	1–4443	20–4506	14–3657	1–4007
Ever-married	2–4856	1– 839	6–4352	12–1637

Table 6b. Mean and range of number of hospitalizations according to marital status, admission period, and sex during the standard reference period

	Males		Females	
	1949–50	1965–67	1949–50	1965–67
Mean				
Single	2.8	4.1	2.9	3.5
Ever-married	2.6	4.3	2.5	3.0
Range				
Single	1–7	1–18	1–13	1–13
Ever-married	1–7	1–14	1–12	1–16

Table 6c. Mean and range of duration per hospital stay (days per hospitalization) according to marital status, admission period, and sex during the standard reference period

	Males		Females	
	1949–50	1965–67	1949–50	1965–67
Mean				
Single	169.5	266.3	186.7	120.5
Ever-married	148.0	65.7	88.0	66.6
Range				
Single	1–1408	8–4506	10–1829	1–1336
Ever-married	2–1619	1– 174	6– 870	9– 260

married males between the two periods; the increase in single males is due to the influence of some hospital stays with extreme duration.

3. Description of the Control Groups

As shown in the literature review (Haverkamp et al. 1982), the essential measures for reproductivity are rate of marriage, marital fertility, and total rate of reproduction. It was necessary to draw two control samples, either with or without considering marital status.

For determination of fertility according to marital status, every patient was matched with a control person drawn randomly from the population register considering sex, year of birth (as measured in classes of 5 years), religion, marital status (single or ever-married), population size of the residence. These persons were examined for the number and date of birth of their children. Since only those subjects who had been living in the same district from their 16th year at the latest were taken into account, the determination of their fertility is reliable. For technical reasons marital status of patients and controls could only be established for the end of the year 1980.

In order to compare the patients' marriage rate and total rate of reproduction with the general population, a second control sample was drawn in an analogous way, except that the controls were not matched for marital status. Since the two control groups have the same distribution of birth years as the patient samples, the long-term trends of reproduction observed in the general population cannot have a biasing influence.

4. Comment

The definition of the index cases as first admissions ensures that the patients are not selected for multiple hospitalizations. They can be regarded as representative of schizophrenics admitted to a hospital in Germany. This is indirectly confirmed by the fact that the annual incidence rate of hospitalized schizophrenics in our samples lies in the same order of magnitude as in the literature. Dunham (1965) and Dilling and Weyerer (1978) give annual incidence rates of 0.1–0.5‰ or 0.24‰, respectively. The incidence rate is defined as the number of new cases per unit of population. In practice, this rate is usually calculated on the basis of a single hospital. Our incidence rate, however, is based on the first ever admissions, and this must lead to somewhat lower values. Furthermore, as in all epidemiological investigations, the number of patients from the residential area who were hospitalized in clinics outside the region cannot be estimated. This loss, however, should not have influenced the observed fertility of the patients.

In the later admission period, the incidence rate decreased, mainly because of fewer male hospitalizations. Admission rates are influenced by various factors, such as economic, social, ecological, or the availability of outpatient services (Häfner 1971). It is therefore difficult to explain the decline of male admissions in this study. The decrease of male hospitalization is not due to a changing age

structure of the residential population. The possibility cannot be ruled out, however, that there is a certain selection of more severe cases in the later period. On the other hand, certain fluctuations in hospital admissions over time have been observed by other authors (e.g. Garrone 1962).

For case definition, clinical diagnosis was used. One might argue that this may have led to influences beyond empirical control. Application of Spitzer's criteria, however, proved to give diagnoses of "definite" or "probable" schizophrenia in the great majority of cases. Furthermore, an analysis of the stability of psychiatric diagnoses during repeated hospital admissions performed in the same region by Klug et al. (1978) showed that the diagnosis of "schizophrenia" has a high stability over time in contrast to some other psychiatric diagnoses.

The declining mean duration of hospital stay observed between the two periods with a concomitant increase of the number of hospital admissions is consistent with general experience in recent years. The two samples of schizophrenic patients reflect the well-known developments of psychiatric hospital care (Häfner and Klug 1982). If these developments influenced the fertility of schizophrenics, this effect should be observable in the patient samples described.

Acknowledgements. The authors gratefully acknowledge the kind support of Prof. Dr. W. Janzarik, Heidelberg, and of Dr. H. Gebhardt, Wiesloch. Dr. M. Maubach was a valuable co-worker at the beginning of the study and Mrs. M. Baumann was of continuous and reliable help during the whole investigation.

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Received November 25, 1982