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Prediction of Outcome and Utilization of Medical Services in a Prospective Study of First Onset Schizophrenics

Results of a Prospective 5-Year Follow-up Study

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Summary. After an introduction on design and definition of constructs, followed by an overview on case-finding, description of cohort and epidemiological considerations, this paper presents results on (social) disability (course of disability, prediction of disability), reported symptoms (course of symptomatology, prediction of symptomatology), observed (psychological) impairments (course of impairments, prediction of impairments, and value of impairment scores as predictors) and the utilization of medical services (scale of predominant utilization levels, longitudinal pattern of care, proportions of time in and out of hospital, prediction of length of hospitalization and cumulative time in rehabilitation institutions) in an epidemiological cohort of first onset schizophrenics prospectively over 5 years.

Key words: Schizophrenia – Symptoms – Impairments – Social disability – Pattern of care – Prediction of outcome

Introduction, Design and Definition of Constructs

This is a report from the follow-up study "On the Development of Disability in Schizophrenics" which was conducted by the Disability Research Unit at the Central Institute of Mental Health in Mannheim (FRG). It forms part of the WHO Collaborative Study "On the Assessment and Reduction of Disability Associated with Schizophrenic Disorders", which has been carried out since 1978 in 7 WHO Collaborative Centres (Giel et al. 1984; Isele et al. 1985; Isele and Angst 1985).

The investigation in Mannheim included 7 assessments over 5 years in an epidemiologically defined cohort of 70 first onset schizophrenic patients in the Mannheim/Heidelberg area. The patients and key persons were interviewed using a fixed set of research instruments at different time points. In total 62 patients participated in all 7 interviews, which is a high follow-up rate with nearly 95% of the expected data sets completed. At the 5-year follow-up, all 67 surviving patients were contacted (3 had committed suicide, 8, 13 and 34 months after the initial examination).

Figure 1 gives the design of the study, indicating the instruments used and the number of complete "respondents" at the 7 time points.

The main objectives were to investigate the course and interrelations of reported symptoms, observed impairments, disability in social roles, and to look for predictors for different outcome variables, including intensity and length of medical care.

In the context of this study, disability was defined as a disturbance in social functions or roles (in family, social group, work etc.) which are expected by the social group or community of the index person (Jablensky et al. 1980; ICIDH/WHO 1980).

Disability was assessed by the Disability Assessment Schedule (DAS), which measures the social behavior over the previous 4 weeks, and which was developed within the framework of this study (Jablensky et al., in preparation; Schubart et al. 1986a, b).

Impairments are deficiencies in functions such as attention, affect display, cooperation, gesture and speech, which can be directly observed by a trained interviewer. Impairments were assessed using the Psychological Impairment Ratings Schedule (PIRS), originally an expansion of the (behavior) sections 18–20 of the Present State Examination (PSE), thus to be identified as observable "signs" separately from reported "symptoms".

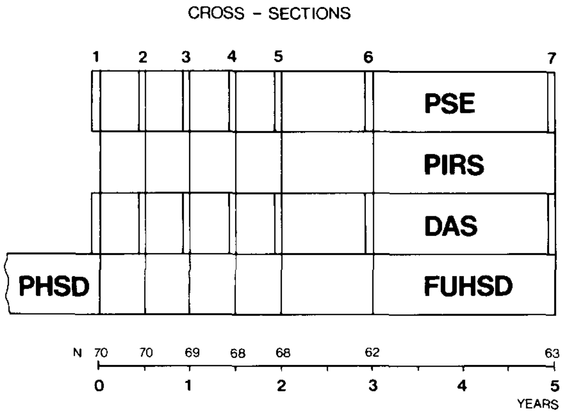

Fig. 1. Design of the WHO Disability Study: instruments, measurement points and cross sections. *Symptomatology:* Present state examination (PSE); *Impairment:* Psychological impairment rating schedule (PIRS); *Disability:* Disability assessment schedule (DAS); *External (environmental) factors:* Evaluation at onset (starting point) past history and sociodemographic description schedule (PHSD); *Course:* Follow-up history and sociodemographic description schedule (FUHSD)

Dedicated to Professor H. Häfner on the occasion of his 60th birthday

Parts of this paper are an abbreviated synopsis of the presentations of the first three authors at the Edinburgh WPA conference Sept. 1985

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Acute symptomatology was assessed by the reported symptoms in the PSE (sections 2–15, 9th edn.; Wing et al. 1974), a standardized clinical interview to assess the psychopathological state over the previous 4 weeks.

In the Past History and Sociodemographic Description Schedule (PHSD) and its follow-up version the Follow-up History and Sociodemographic Description Schedule (FUHSD) the number and duration of psychotic episodes and hospitalizations, treatment, life-events and sociodemographic variables were recorded for the intervals between assessments in monthly steps.

Case-finding, Description of Cohort and Epidemiological Considerations

In and outpatients were included in the Rhine-Neckar cohort in accordance with the following criteria (cf. WHO 1973, 1979):

- residence in the defined catchment area (Mannheim, Heidelberg and Rhine-Neckar County, representing a total population of about 900,000),
- age between 15 and 44 years,
- absence of gross organic brain disease, serious mental or sensory disability, alcohol- or drug-addiction.
- onset of illness, defined by the criteria below, not more than 1 year before inclusion,
- treatment (out or inpatient) in the psychiatric hospitals serving this area (State Hospital Wiesloch, University Clinic Heidelberg, Central Institute of Mental Health, Mannheim),
- patients suffering from hallucinations, delusions of non-affective type (i.e., not depressive delusions of guilt or manic delusions of grandeur) and/or thought and speech disorder (other than mere retardation or acceleration).

Details of the case-finding procedure have been described elsewhere (Schwarz et al. 1980). The 1-year incidence rate of schizophrenics within the age limits of 15 and 44 years of age was 10.2 per 100,000 population on the basis of the above screening criteria. Interestingly the rate was 9.24 considering CATEGO (Wing et al. 1974) classes S, P, O, and 6.1 if considering only class S+. These figures are very similar to the rate of PSE-controlled incidence in Buckinghamshire (Watt et al. 1983; Falloon et al. 1978a, b), where the figure for S+ cases was 5.8. The recent data from the WHO "Determinants of Outcome" Study (Jablensky et al., in preparation) with a rate of 7 per 100,000 in Aarhus and 9 per 100,000 in Dublin for S+ cases show that narrow, operational criteria of case definition yield very similar incidence rates in different centers.

Results and Discussion

This report will

(1) demonstrate the course of illness up to the 5-year follow-up for the outcome variables:
  - disability in social behavior
  - reported psychotic symptoms
  - observed impairments
  - pattern of aftercare and rehospitalization,

(2) present results on the predictors of these different outcome variables at the 2-, 3- and 5-year assessments, and

(3) illustrate the utilization of medical services.

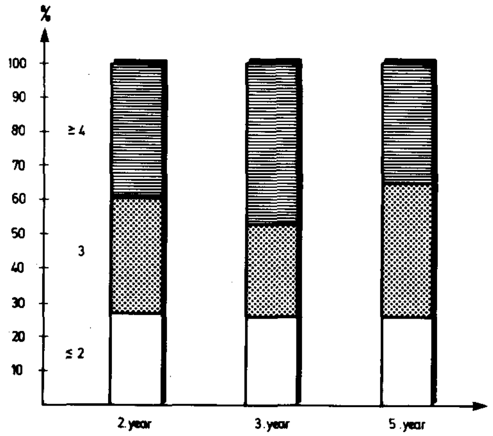


Fig. 2. Disability score. *≤2* Good social adjustment; *3* Intermediate social adjustment; *≥4* Poor social adjustment (cf. Schubart et al. 1986a)

(Social) Disability

Course of Disability. The following description of the course of disability refers to a weighted global score ranging from 1 (= very good social adjustment) to 6 (= very poor social adjustment) (for details see Schubart et al. 1986a). Figure 2 shows the distribution of the DAS scores for the last three cross sections. The patients were grouped into a good extreme group, an intermediate, and a poor extreme group. The distributions of scores 2, 3 and 5 years after initial assessment was quite similar: at the 5-year follow-up 26% of the patients showed a good social adjustment, 39% were in the intermediate group and 35% belonged to the "poor" extreme group.

Prediction of Disability. At a next stage of analysis, we looked for associations between the DAS score at the different cross sections with a number of possible (potential) predictors. These variables were taken from earlier investigations (WHO 1979; Strauss et al. 1977) and from clinical experience and were expected to be especially important or influential in the course of schizophrenic disorders. The following groups of predictors were involved in this analysis:

- sociodemographic variables
- symptomatology at initial assessment
- treatment variables
- "negative symptoms" (rated as observed "impairments" in our study)
- disability score 6 months after initial assessment
- variables concerning the home atmosphere and characteristics of the key figure (in an attempt to explore home atmosphere influences) at initial assessment.

Table 1 gives the associations between predictors and the DAS scores at 2, 3, and 5 years after initial assessment. Their strength is indicated by the level of significance of either χ^2 or Fisher's exact test (which varies between 0 and 1 and is reciprocal to the strength of the association).

Concerning the sociodemographic variables, the kind of living situation was the only significant predictor in all cross sections: patients who lived alone or with their parents were more disabled than patients living with their spouse or in a sheltered apartment.

Table 1. Prediction of Disability Score at follow-up time points

Predictors	2nd year	3rd year	5th year
Sex	N.S. 0.46	N.S. 0.21	N.S. 0.70
Age	N.S. 0.15	N.S. 0.19	N.S. 0.66
Educational level	N.S. 0.38	N.S. 0.46	N.S. 0.39
Occupation	N.S. 0.11	N.S. 0.77	N.S. 0.77
Marital status	N.S. 0.14	* 0.02	N.S. 0.26
Parental status	N.S. 0.26	N.S. 0.12	N.S. 0.92
Living situation	† 0.07	** 0.01	** 0.01
ICD-diagnosis of psychiatrist	N.S. 0.78	N.S. 0.25	N.S. 0.28
ICD-diagnosis (CATEGO)	N.S. 0.40	N.S. 0.77	N.S. 0.51
Type of onset	† 0.09	N.S. 0.27	N.S. 0.69
Duration of acute psychotic symptomatic/first 6 months	N.S. 0.70	N.S. 0.17	N.S. 0.24
Duration of medication/ first 6 months	N.S. 0.12	N.S. 0.13	* 0.03
Duration of treatment/ first 6 months	† 0.08	N.S. 0.61	N.S. 0.18
Number of days in hospital during first year	* 0.03	N.S. 0.20	N.S. 0.18
Negative symptoms/2nd cross section PIRS: NESY	** 0.01	* 0.04	† 0.07
Disability score/2nd cross section DAS score	** 0.00	** 0.00	** 0.00
Key figure	† 0.10	N.S. 0.18	N.S. 0.11
Face-to-face contact/h per week	N.S. 0.13	N.S. 0.78	N.S. 0.79
Emotional involvement (key figure)	N.S. 0.94	N.S. 0.97	N.S. 0.75
Control and demand	* 0.05	** 0.01	N.S. 0.19
Rejection	N.S. 0.45	† 0.07	N.S. 0.14
Premorbid sexual adjustment	N.S. 0.48	N.S. 0.62	N.S. 0.18

The initial marital status reached significance only at the 3-year follow-up, singles were identified as more disabled than married patients.

Concerning treatment variables, the duration of (neuroleptic) medication in the first 6 months after onset predicted disability outcome at the 5-year follow-up (longer medication was associated with more disability), and the cumulative number of days in hospital during the first year predicted disability at the 2-year follow-up (longer stay was associated with more disability). The extent of negative symptoms (a sum score of observed "minus" behavior recorded with the PIRS see below) and the disability score 6 months after initial assessment predicted disability at all cross sections. The presence of negative symptoms correlated with a poor disability score in the course of illness; in addition, the disability score 6 months after the initial assessment predicted the disability score at all later cross sections.

The predictor "control and demand by the key figure" was the only variable in a section in analogy to "expressed emotions", which was significantly associated with the disability score at the 2- and 3-year follow-up (higher extent of control and demand corresponded with poor disability). Other key person variables were only relevant in subgroups and specific settings, but some interesting associations warrant further analyses of our longitudinal observations of home atmosphere at 7 time points.

Reported Symptoms

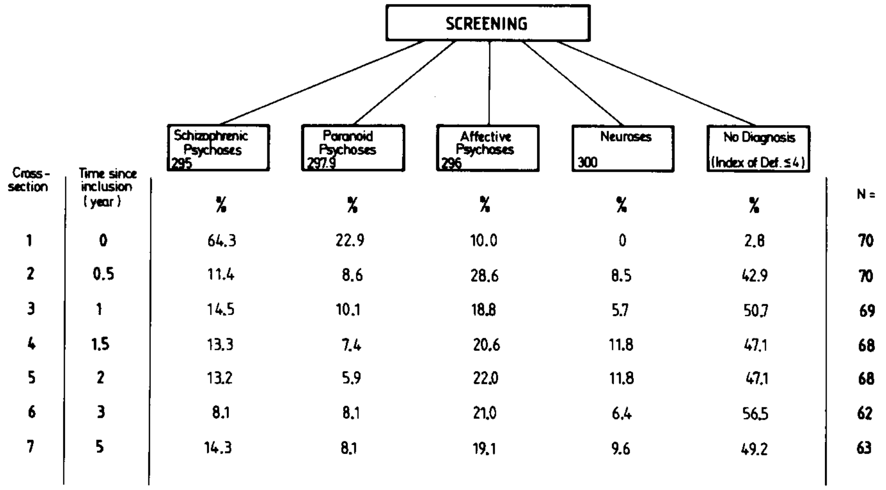
Course of Symptomatology. Figure 3 gives the percentages of the different CATEGO tentative ICD diagnoses at the 7 time points over 5 years. The percentages of patients without diagnoses was based on those who had an index of definition smaller than or equal to 4. Schizophrenic psychoses (ICD 295) and paranoid psychoses (297.9) were diagnosed in the initial assessment in 87% of the cohort, the 2 cases who had no diagnoses at the initial assessment are explained by the 4-week time limit: their psychotic productive symptoms in the sense of the screening criteria had subsided before the period covered by the interview. At later cross sections, patients with schizophrenic or paranoid psychoses only amounted to 16% to 25%. The proportion of affective psychoses (ICD 296) diagnosed by CATEGO was initially around 10%, increasing to about 29% at the half-year follow-up and making up about one-fifth of the cohort from the 1-year follow-up until the end of the study.

When we looked at the individual cross sectional diagnoses and their time course, we found that 6 patients, who initially had characteristic schizophrenic symptoms, later received only cross sectional diagnoses in the affective group. Also 2 further patients, who had received CATEGO diagnoses of schizophrenic or paranoid psychosis in the first three cross sections, then changed to affective psychotic diagnoses only, if any, at the cross sections up to 5 years.

Looking for similar findings in the literature, Sheldrick et al. (1977) reported on a similar subgroup of "schizophrenia succeeded by affective illness", these cases either came from earlier Maudsley patients or the London IPSS cohort, the latter also being classified according to the PSE/CATEGO system. Together with another study reported by Hirsch and Leff (1985) on depression in schizophrenia, we agree partially with these authors that "evidence in favor of a clear change from schizophrenic to manic-depressive symptomatology carries significance for the disease entity theory and for the classification of the functional psychoses as a whole" (Sheldrick et al. 1977). However, further analyses will be necessary to identify whether these patients are those labeled "schizo-affective" by some clinicians in our study and who received lithium during the later part of their illness course.

The next outcome variable to be examined was the cumulative duration of productive psychotic episodes. This variable was computed by adding up the number of months during the past year in which the patient had productive symptoms such as delusions, hallucinations, and/or thought disorders.

A comparison between the 2- and the 5-year follow-up showed that about 50% of the patients had not suffered from



Cross-section	Time since inclusion (year)	Schizophrenic Psychoses 295 %	Paranoid Psychoses 297.9 %	Affective Psychoses 296 %	Neuroses 300 %	No Diagnosis (Index of Def. ≤ 4) %	N =
1	0	64.3	22.9	10.0	0	2.8	70
2	0.5	11.4	8.6	28.6	8.5	42.9	70
3	1	14.5	10.1	18.8	5.7	50.7	69
4	1.5	13.3	7.4	20.6	11.8	47.1	68
5	2	13.2	5.9	22.0	11.8	47.1	68
6	3	8.1	8.1	21.0	6.4	56.5	62
7	5	14.3	8.1	19.1	9.6	49.2	63

Fig. 3. Rhine-Neckar cohort. Cross sectional diagnoses of 7 time points over 5 years (PSE/CATEGO tentative ICD diagnoses)

any acute psychotic episode (or relapse) during the preceding year. The number of patients who had been psychotic for more than 7 months in the respective year, however, increased from 13% at the 2-year follow-up to 32% at the 5-year follow-up.

Prediction of Symptomatology. Table 2 shows the results of the associations between predictors and the duration of psychotic episodes in the preceding years at the different cross sections:

Age (for the 5th year) and parental social status (for the 3rd year) were the only significant sociodemographic variables. Patients from the lower classes showed a better outcome than patients from the upper and higher middle class and older aged patients at the onset of illness showed a better outcome than the younger ones.

"Negative symptoms" (impairment subscore, see below) and disability score 6 months after initial assessment had a significant influence on the relative proportion of time in an episode.

The influence of face-to-face contact and of premorbid sexual adjustment on this outcome variable was significant, but not in the expected direction: face-to-face contact of more than 35 h/week (at an early stage of the illness course) corresponded to a better outcome. Patients with a good premorbid adjustment did not have a better "episodic course" than patients with poor premorbid adjustment (as opposed to results with the disability course as the dependent variable).

Observed Impairments

For this WHO study, special emphasis was placed on separating the reported symptoms from behavior observed by a trained rater in a direct interview with the patient. In accordance with the ICIDH (WHO 1980), these have been named "(psychological) impairments". Much of what is known as "negative symptoms" in psychiatric literature is actually based on observation of behavior rather than report of symptoms. The old concept of "signs" seems to be closest to the impairment concept (Carpenter et al. 1978; Jablensky 1981).

Course of Impairments. Figure 4 shows the mean scores of the PIRS items and two subscores. The latter have been defined a priori as either being commonly associated with disturbed behavior during productive psychotic episodes (POSY; including items such as agitation, catatonic movements, hostility, etc.) or "minus behavior" or "negative symptoms" commonly attributed to residual states or intervals (NESY; including items such as lack of initiative, blunted affect, reduced speech, etc.).

After a clear decline of all three scores from the initial assessment until the 4th cross section, the PIRS score rose again at the later time points. This increase in (mean) extent of impairments could clearly be attributed to the increase in the NESY subscore (i.e., more residual or deficit behavior observed), whereas POSY remained at a stable level throughout all follow-up assessments.

Prediction of Impairments and Value of Impairment (Sub)Scores as Predictors. Although all potential predictors (as listed in Table 2) were investigated, only the following associations with the outcome variable "total impairment score after 5 years" were statistically significant: PIRS score at 6 months follow-up ($P \leq 0.001$), DAS score at 6 months follow-up ($P \leq 0.01$), NESY subscore at 6 months follow-up ($P \leq 0.05$), and initial CATEGO Index of Definition ($P \leq 0.05$) as the only predictive symptom variable.

All sociodemographic, treatment and ICD diagnosis variables failed to predict this outcome measure. The best "predictor" (or rather early indicator) was the total PIRS score at the half-year time point, which coincided with other results indicating a high stability of these "psychological impairments" and an early occurrence of the minus syndromes in that subgroup of patients with poorer outcome. This was furthermore supported by the significant associations with the NESY subscore and the DAS score of the half-year assessments.

A brief comment on the only CATEGO measure (of the initial cross section) being predictive. The Index of Definition, quite a global measure of psychopathological severity, was not, in our nomenclature, simply a (reported) symptom aggregate, but also mixed with some of the (quite severe) "behavior and sign" ratings in the PSE, thus being "contaminated with impairments".

Comparing (sub)scores of the three central constructs described above, Table 3 gives the respective levels of signifi-

Table 2. Prediction of "duration in acute psychotic episode" (in year preceding follow-up)

Predictors	2nd year	3rd year	5th year
Sex	N.S. 0.25	N.S. 0.54	N.S. 0.39
Age	N.S. 0.38	N.S. 0.71	* 0.02
Educational level	N.S. 0.99	N.S. 0.28	N.S. 0.54
Occupation	N.S. 0.18	N.S. 0.24	N.S. 0.27
Marital status	N.S. 0.43	N.S. 0.52	N.S. 0.15
Parental status	† 0.07	** 0.01	N.S. 0.94
Living situation	N.S. 0.23	N.S. 0.37	N.S. 0.19
ICD-diagnosis of psychiatrist	N.S. 0.55	N.S. 0.43	N.S. 0.74
ICD-diagnosis (CATEGO)	N.S. 0.90	N.S. 0.62	N.S. 0.24
Type of onset	N.S. 0.85	N.S. 0.32	N.S. 0.43
Duration of acute psychotic symptomatic/first 6 months	N.S. 0.31	N.S. 0.36	N.S. 0.17
Duration of medication/ first 6 months	N.S. 0.39	N.S. 0.19	N.S. 0.76
Duration of treatment/ first 6 months	N.S. 0.36	N.S. 0.63	N.S. 0.63
Number of days in hospital during first year	N.S. 0.22	† 0.10	N.S. 0.70
Negative symptoms/2nd cross section PIRS: NESY	* 0.02	N.S. 0.12	* 0.02
Disability score/2nd cross section DAS score	** 0.01	† 0.06	* 0.03
Key figure	N.S. 0.62	N.S. 0.49	† 0.06
Face-to-face contact/h per week	* 0.04	N.S. 0.38	N.S. 0.79
Emotional involvement (key figure)	N.S. 0.90	N.S. 0.73	N.S. 0.94
Control and demand	N.S. 0.86	N.S. 0.21	N.S. 0.85
Rejection	N.S. 0.71	N.S. 0.82	N.S. 0.54
Premorbid sexual adjustment	N.S. 0.40	N.S. 0.99	* 0.02

cance of the associations between selected scores at the half-year with the 5-year outcomes. Clearly, "impairment" was the best (including its subscores) in predicting not only impairment outcome, but also symptoms (delusion, residual, and anxiety/dysphoria subscores of the PSE) and disability (Hawk et al. 1975; Carpenter et al. 1978).

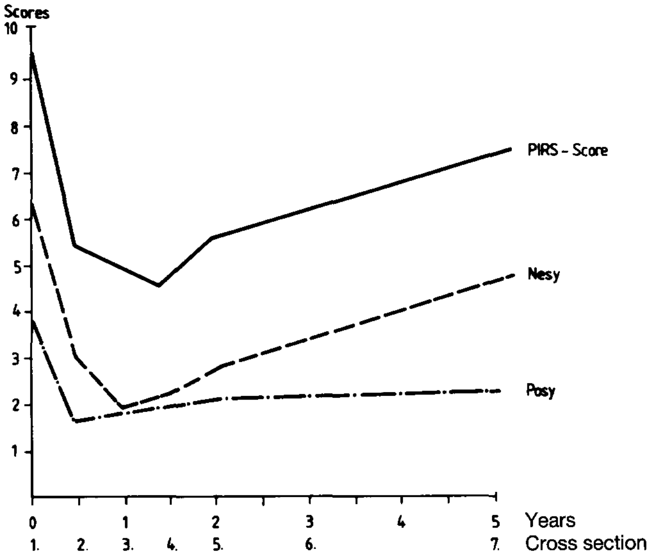


Fig. 4. Course of impairments. PIRS score = sum-score of impairments; NESY score = sum-score of selected impairments (observed); POSY score = sum-score of selected impairments (observed)

Table 3. Can the 5-year outcome of symptoms, impairment and disability be predicted at an early stage (6 months after onset)?

Scores 6 months after onset	7th cross section (5-year outcome scores)						
	Prod.	Minus symptoms	Anxiety	PIRS	POSY	NESY	DAS
Productive symptoms	†		†	†		†	†
PIRS	*	**		**	***	**	***
POSY	*	**		**	**	**	**
NESY		*		*	*		*
DAS		**		*	*	†	*

† $P(\chi^2) \leq 0.10$
* $P(\chi^2) \leq 0.05$
** $P(\chi^2) \leq 0.01$
*** $P(\chi^2) \leq 0.001$

Utilization of Medical Services

The Scale of Predominant Utilization Levels. The following results are based on data gathered with the FUHSD/WHO (Jablensky et al. 1980). By combining the variables of medication, dichotomized as neuroleptics received or not received, the care-taking institution and the presence of acute psychotic symptoms, we reduced the complexity of the utilization of institutional variables to one single indicator of a monthly measured utilization variable with ten different levels, two of them representing "missing data", the other a declining sequence of intensity of care. This scale of predominant utilization was elaborated on earlier versions by Häfner and an der Heiden (1983). Results within the Disability Study up to the 2-year follow-up have been published by Krüger et al. (1985) and Schubart et al. (1986b).

The Longitudinal Pattern of Care. For every patient we produced an individual utilization diagram, indicating the beginning and duration of the predominant form of utilization.

For the total group of patients the monthly frequency distributions of predominant forms of utilization were computed. By adding these distributions consecutively, a longitudinal pattern of different levels of care results as shown in Fig. 5.

At the beginning, nearly all patients (95%) were in hospital. The proportion of inpatients declined rapidly until the 4th

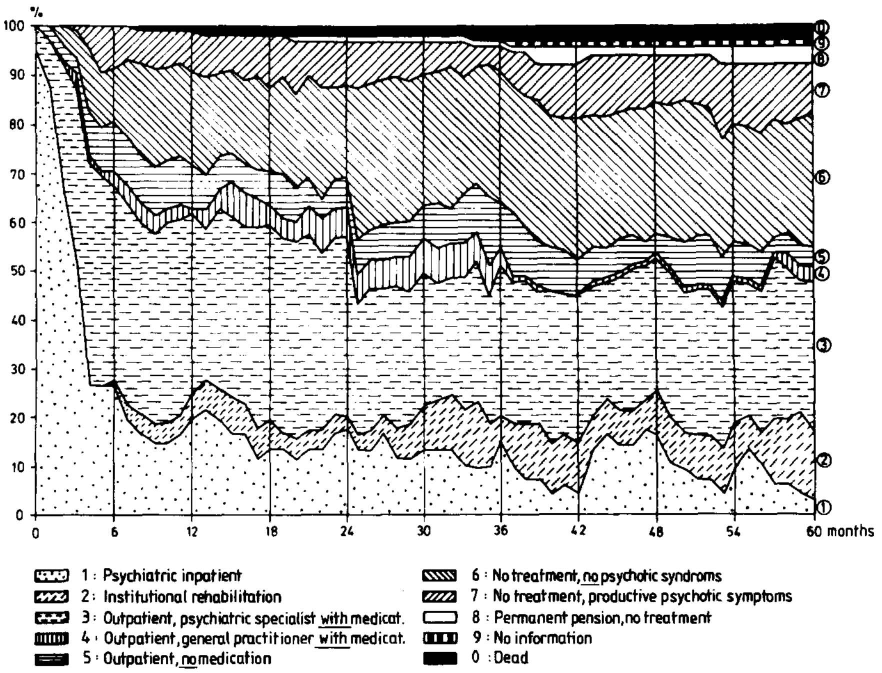


Fig. 5. Longitudinal utilization pattern of the total group (n = 70)

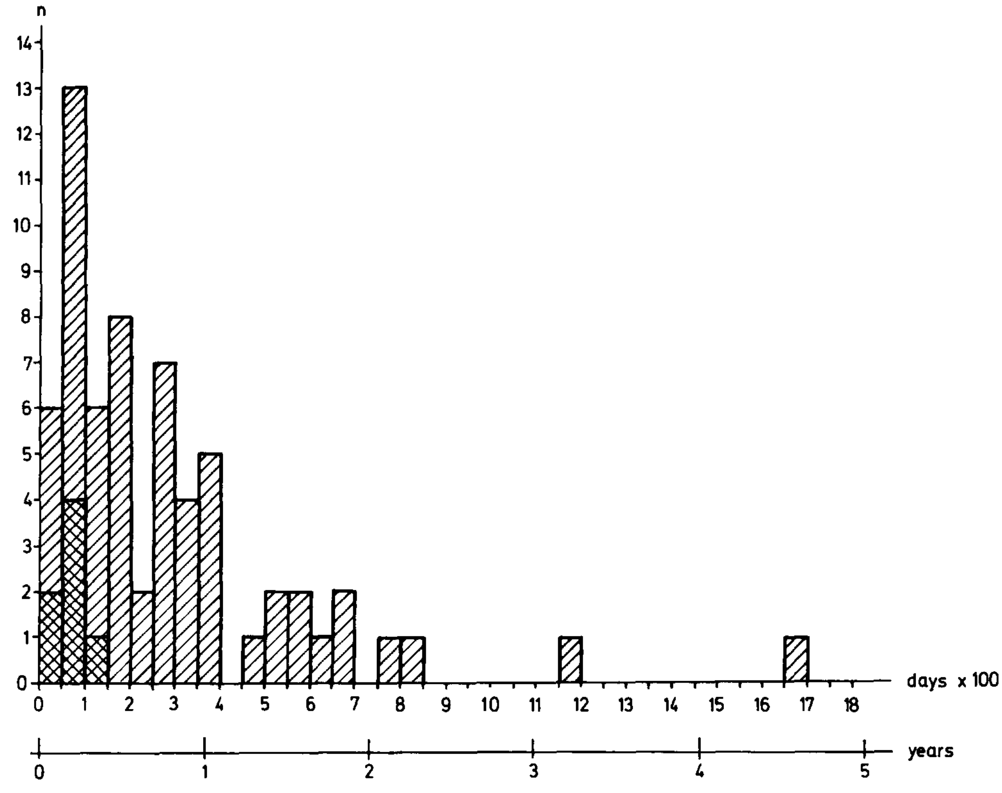


Fig. 6. Number of days in hospital (cumulative over 5 years). Frequency distribution of cumulative lengths of hospitalization in 5 years (= 1800 days) (including initial hospitalization). (▨) Patients with complete follow-up (n = 63). (▩) Last available information on missing (n = 4) and deceased (n = 3) cases, respectively

Table 4. Lengths of continuous "community survival" after last hospital discharge (until end of study). Total n = 67 (3 died before end of study). Maximum time of follow-up information: 72 months

Time	n	% of cohort	Mean continuous duration outside hospital
12 months	44	65.7	39.52 months
24 months	32	47.8	48.25 months
36 months	22	32.8	58.87 months
48 months	17	25.4	63.47 months
54 months	16	23.9	64.19 months

month, when 25% (≙18 patients) of the cohort were still in the clinic. The percentage of inpatients further declined modestly until the 42nd month, when 6% (≙4 patients) of the patients were in hospital, 1 of them still has his first stay. We found two smaller peaks at the 48th and 55th months with 17% (n = 12) and 13% (n = 9) as inpatients, but at the end of the study the proportion of inpatients again reached the minimum of the 42nd month with only 3 inpatients.

The level 2 in Fig. 5 shows the proportion of patients in institutional rehabilitation, which reached its maximum at the end of the study with 15.7% (n = 11).

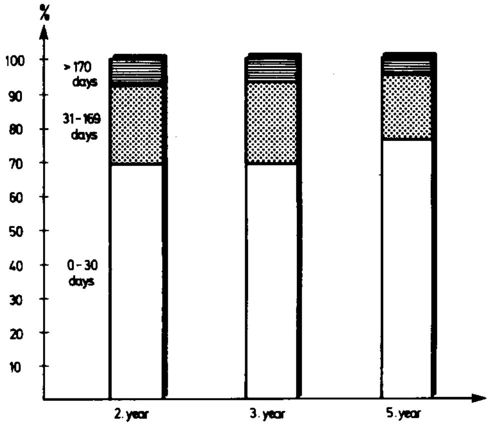


Fig. 7. Distribution of lengths of stay (Number of days in hospital per specified year)

The most frequent form of aftercare was consultation with a psychiatric specialist, who prescribed and controlled the medication of outpatients. After the first 6 months between 30% and 40% of the patients used this form of aftercare every month. On the contrary, the extent of aftercare by the general practitioner alone could be neglected: during the first 3 years only 5 patients used it, after that time only 1 or 2 patients. Also the proportion of patients who attended an outpatient service without medication was rather small, never reaching more than 10%. The proportion of persons without symptoms or medication increased over the first 2 years and reached a stable level of one-third of the cohort for the last 3 years. But there was another group, about 7% to 15% of the cohort, who received no treatment despite having severe (productive) symptoms. One or two patients with a permanent pension did not contact the services any more, one could not be reached at the end of the study, and three had committed suicide.

Proportions of Time In and Out of Hospital. For the 63 patients with complete follow-up, the mean time in hospital lasted about 9 months, distributed between 1 to 13 clinical stays with a median number of nearly 3 hospitalizations. Over the 5 years, 1 patient spent just 5 days in the clinic, 4 patients were hospitalized for longer than 2 years, 1 of them for 55 months, almost the whole time of the study (Fig. 6). A total of 18 patients were not rehospitalized, 20 had one further rehospitalization, 12 had two, and 11 three. More than 45% of the patients had two or more rehospitalization, but more than three rehospitalizations occurred for only 9 (13%) of the patients.

For the first hospitalization, the mean length of stay was 5 months, 3.5 for the second, 3 for the third, and 3.2 for the fourth. The mean interval out of the clinic lasted 32, 18, and 21 months for the first three periods out of hospital.

As shown in Table 4, 16 patients (i.e. 24% of the survivors) spent at least 54 months outside the clinic after their first hospitalization. Calculating the minimum observation period after the last hospital discharge, there were 44 patients with no clinical readmission during the last completed year of the study, 32 of these had been out of the clinic for 2 years, 22 for 3 years and 17 for 4 years ("community survival", Lamb 1976).

Prediction of Lengths of Hospitalization and Cumulative Time in Rehabilitation Institutions

Figure 7 demonstrates the distribution of the duration of hospitalization in specified years (preceding assessments 5, 6, and 7).

Table 5. Prediction of "number of days in hospital" (in year preceding follow-up)

Predictors	2nd year	3rd year	5th year
Sex	N.S. 0.65	N.S. 0.14	N.S. 0.53
Age	N.S. 0.22	N.S. 0.65	N.S. 0.28
Educational level	N.S. 0.45	* 0.02	N.S. 0.23
Occupation	N.S. 0.99	N.S. 0.11	N.S. 0.22
Marital status	N.S. 0.82	N.S. 0.60	N.S. 0.47
Parental status	** 0.01	N.S. 0.27	N.S. 0.95
Living situation	N.S. 0.50	N.S. 0.24	N.S. 0.23
ICD-diagnosis of psychiatrist	N.S. 0.50	** 0.01	N.S. 0.27
ICD-diagnosis (CATEGO)	N.S. 0.36	N.S. 0.39	N.S. 0.64
Type of onset	N.S. 0.46	N.S. 0.61	N.S. 0.47
Duration of acute psychotic symptomatic/first 6 months	N.S. 0.29	N.S. 0.18	N.S. 0.69
Duration of medication/ first 6 months	N.S. 0.36	N.S. 0.25	N.S. 0.20
Duration of treatment/ first 6 months	N.S. 0.58	N.S. 0.49	N.S. 0.28
Number of days in hospital during first year	** 0.01	N.S. 0.14	N.S. 0.36
Negative symptoms/2nd cross section PIRS: NESY	N.S. 0.15	N.S. 0.28	* 0.04
Disability score/2nd cross section DAS score	† 0.10	** 0.01	N.S. 0.13
Key figure	N.S. 0.69	N.S. 0.32	N.S. 0.41
Face-to-face contact/h per week	N.S. 0.56	N.S. 0.42	N.S. 0.37
Emotional involvement (key figure)	† 0.10	N.S. 0.14	N.S. 0.49
Control and demand	N.S. 0.58	N.S. 0.35	N.S. 0.92
Rejection	N.S. 0.80	N.S. 0.87	N.S. 0.53
Premorbid sexual adjustment	** 0.01	N.S. 0.22	N.S. 0.41

The number of patients who spent less than 30 days in hospital increased from the 2-year to the 5-year follow-up from 69% to 76%.

At the 5-year follow-up only 5% had been hospitalized for more than 170 days in that 5th year. At a first glance, the shorter relative duration of hospital stay at the 5-year follow-up seemed to contradict the higher proportions of patients with permanent or long lasting productive symptoms during that year. However a plausible explanation for this was found by looking at the individual cases: mainly patients with "chronic" delusions and/or thought disorders were concerned who hardly ever contacted any medical services, lived in the community, in social "niches", at home, or in similar arrangements.

Table 5 shows the predictors which had a significant influence on this outcome variable at different time points (marked by asterisks on the Table):

- previous educational level for the 3-year follow-up (a higher educational level corresponded with better outcome),
- parental social status for the 2-year follow-up (upper class corresponded with poor outcome),
- diagnosis of psychiatrist for the 3-year follow-up (schizophrenia of paranoid type – ICD 295.3 corresponded with better outcome),
- number of days in hospital during 1st year (short stay corresponded with good outcome),
- negative symptoms (NESY score) for the 5-year outcome,
- disability score (3-year) and
- premorbid sexual adjustment for the 2-year outcome (good premorbid adjustment corresponded with good outcome).

No single predictor was fully consistent over time, a matter to be further explored and discussed.

Another important measure of service utilization and aftercare was the cumulated time spent in rehabilitation institutions over 5 years after onset of psychosis. Presumably, this measure would be a pragmatic indicator to identify patients with a more chronic course and a need for prolonged "social skills" intervention at least in the eyes of the clinicians who refered them to such institutions (independently from the researchers judgment).

Marital status (single patients staying longer) and parental social status (lower social class of parents related to longer stays) were significant sociodemographic variables ($P \leq 0.05$), whereas there was again no influence noted for the diagnosis and treatment variables. The overall impairment score ($P \leq 0.01$), the NESY impairment score ($P \leq 0.001$) and the disability score ($P \leq 0.01$) showed the highest correlations with this measure: this seemed to be an early indicator, and also a target area of problems which brings and keeps a subgroup of patients in rehospitalization settings.

As a brief footnote, it should be noted that the kind of key person as such only showed a trend to influence length of reha-stay, but looking at the key person characteristic "lack or presence of warmth" (scored similarly to concepts of the EE researchers), its lack was highly predictive for longer stay.

Conclusions

This paper presented findings on the "natural course" (Ciompi 1980; Pietzecker and Gaebel 1983) of first episode schizophrenics, and epidemiological and diagnostic issues were briefly discussed. Interestingly, the attempts to test a series of presumed "predictors" of different categories or levels of outcome were most challenging in this quite complete "naturalistic" cohort (representative, high follow-up rate, no interference of researchers and treatment agencies, as opposed to many studies, e.g., Watt et al. 1983; Crow et al. 1986).

Summing up we can draw the following conclusions on the associations between predictors and outcome variables. We define a variable as a "predictor" with good prognostic power, when the following preconditions are fulfilled: (1) there should be a continuous association between the predictor and the outcome variable at different cross sections in the course of illness, and (2) there should be a systematic association corresponding to theoretical conceptions and based on plausible results of other empirical studies.

Under these assumptions, the results showed: (1) the outcome variables differed with regard to the number of significant predictors: it is easier to predict disability (i.e., the DAS score) than the productive psychotic symptomatology and the duration of hospitalization in the course of illness. The latter two variables seemed to be influenced by other factors (e.g., psychiatric treatment) which were not considered in our list and will be partially discussed elsewhere. In particular for the outcome variable: "number of days in hospital", the number of significant predictors decreased in the course of time (e.g., the sex differences).

(2) The extent of impairments (PIRS score and subscores POSY and NESY) and the DAS score 6 months after initial assessment were the best prognostic variables. They predicted nearly all outcome variables at nearly all time stages with a high level of significance; we interpret this result with the high stability of these two predictors: the extent of "negative symptoms" (i.e., observed impairments) 6 months after initial assessment correlated highly with the extent of "negative symptoms" at all later cross sections up to the 5-year follow-up.

The same statement could be made for the DAS score 6 months after the initial assessment, which predicted the DAS score at all later cross sections. The stability of this outcome variable itself may be a reason for the high number of significant predictors, compared with the two outcome variables "time in acute psychotic episodes" and "hospitalization".

(3) The (reported) symptomatology at initial assessment hardly influenced the outcome of illness. One possible explanation for this result may be the fact that our cohort consisted of schizophrenics of recent onset, who at that time represented psychopathologically a rather homogenous group, due to the screening criteria.

(4) Concerning sociodemographic variables and variables analoguous to the "expressed emotions" concept, no systematic associations with the outcome variables were found. Here again, the low stability of these predictors may be responsible for this result. It must be reported that some sociodemographic variables (occupational status, marital status, living situation) and more so the living arrangements, contact time and the behavior of the key figure toward the patient changed over time. This will require further analysis of subgroups with changes in these variables. Therefore it is not surprising, that no stable associations between these expected predictors and the outcome variables were found in the present analysis of course over 5 years.

A more detailed analysis of the existing data may confirm evidence we found for special risk groups for impairments and disability (male patients living alone or with their parents, patients with "negative symptoms" and a poor disability score at the beginning) and hopefully give relevant and practical guidelines for ongoing or planned rehabilitation measures and their evaluation. Last but not least, the data from other centers of this WHO Disability Study, the population control groups for the Rhine-Neckar (Mannheim) and the Burghölzli (Zürich) cohorts, and the parallel WHO "Determinants of Outcome" Study (using the same set of instruments) will yield an opportunity for cross-cultural comparison.

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